

The Mining Journal

LONDON, MARCH 4, 1960

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International NU-SWIFT News

No. 3

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41. The UNITED KINGDOM ATOMIC ENERGY AUTHORITY have protected DOUNREAY EXPERIMENTAL REACTOR ESTABLISHMENT in remote CAITHNESS in the North of Scotland with reliable Nu-Swift. The U.K.A.E.A. has some fire risks: The fire in 1957 at their Windscale No. 1 pile cost £1,967,826.

42. KUNGL. SJO FARTSSTYRELSEN, progressive Sweden's Ministry of Transport responsible for safety of life at sea according to the 1948 London Convention, was first maritime authority to approve Nu-Swift 30-lb. Dry Powder Extinguisher, Model 1630, for use afloat. Approval is conditional upon spare charges also being carried.

43. SAS, SCANDINAVIAN AIRLINES SYSTEM, justly renowned for service and efficiency, and 'First over the Pole' recently opened their new LONDON headquarters in fashionable Conduit Street. Nu-Swift protects the whole building, from which reservations all over the world can be made in a few minutes, before long further to be accelerated by the installation of electronic equipment.

44. Sir HUGH CASSON, famous British architect and exponent of MODERN DESIGN, is one of the many professional men whose premises are protected by Nu-Swift.

45. Rendezvous of the cosmopolitan smart set, the famous Palace Hotel, ST. MORITZ, Switzerland, near the Cresta Run, is now protected by Nu-Swift. So are many of the vessels of the rich GREEK SHIPOWNERS who make the Palace Hotel their winter headquarters.

46. Norwegian WHALE CATCHING SHIPS each year set out from SANDEFJORD, Norway, destined for hazardous adventures in ANTARCTICA. Six or nine months later they return after incredible hardship, but often with the pockets of the crew lined with gold. Most whalers and floating

whale factories are equipped with reliable Nu-Swift.

47. In lovely GREENLAND, no longer merely the home of eskimos and a colony but part of the Kingdom of Denmark, with output from cryolite mines becoming of increasing economic importance, trading posts of the ROYAL GREENLAND TRADING CORPORATION have been equipped with Nu-Swift.

48. The HOME OFFICE FORENSIC LABORATORY at PRESTON, LANCS., ENGLAND, famous for its fact-searching work in many murder trials has been equipped with Nu-Swift.

49. Now also available with instructions in ARABIC, Nu-Swift extinguishers can be specified in this and any of 13 OTHER LANGUAGES at no extra charge.

50. PUNCH, the famous weekly, in recent years brightened by a face-lift, is now also, to prevent possible interruption in publication, protected by Nu-Swift. So are the giant presses in the three cities of publication of the DAILY EXPRESS, printed simultaneously every day in 4,000,000 copies, in LONDON, MANCHESTER and GLASGOW.

51. In GUATEMALA, prosperous Central American State, all the BANKS, except one, are protected by reliable Nu-Swift.

52. In the unhappy event of another global war, many CIVIL DEFENCE EXPERTS believe that the self-contained Nu-Swift Universal (Royal Navy) 2-gallon Water/CO₂ extinguishers will be of great value in dealing with the many small fires likely to flare up at some distance from a THERMONUCLEAR EXPLOSION at a time when public water supplies will probably be interrupted.

53. Where only a century ago, native warriors, with unexampled ferocity, fought the white man in ZULULAND, local farmers are now forming themselves into Nu-Swift fire-fighting groups of five to pool their Nu-Swift fire posts and jointly combat attacks of the equally ferocious Fire Fiend. Twenty-nine such groups have so far been organised; they have proved themselves of great value in combating dangerous SUGAR CANE FIRES.

54. Through the failure of old soda acid extinguishers, CLOVER MEATS LTD., WATERFORD, Republic of IRELAND, a firm which does a large export business, lost a contract worth £80,000. In consequence, 69 soda acid extinguishers were scrapped and instead reliable Nu-Swift were installed to the tune of £1,500.

55. The private railway coach of President KEKKONEN, the first citizen of democratic FINLAND, is now protected by effective, and reliable Nu-Swift Dry Powder Extinguisher, Model 1604.

56. 'Guinness is good for you', says the famous slogan of the GUINNESS BREWERY, in Dublin, a national institution in the REPUBLIC OF IRELAND. It is now protected by Nu-Swift, and that, of course, is good for GUINNESS!

57. Founded in 1843, the NATIONAL METSOVIAN POLYTECHNIC SCHOOL IN ATHENS, GREECE, the largest and most important scientific institution in South Eastern Europe and the Middle East has, after exhaustive investigation, decided to standardise on Nu-Swift extinguishers. Initial order was obtained in the teeth of keen, local, German, American and Italian competition.

58. To ensure rapid, reliable and efficient operation at sub-zero temperatures, THE PORT OF HELSINKI AUTHORITY, FINLAND, has installed Nu-Swift Dry Powder Extinguishers for the protection of all its buildings and cranes.

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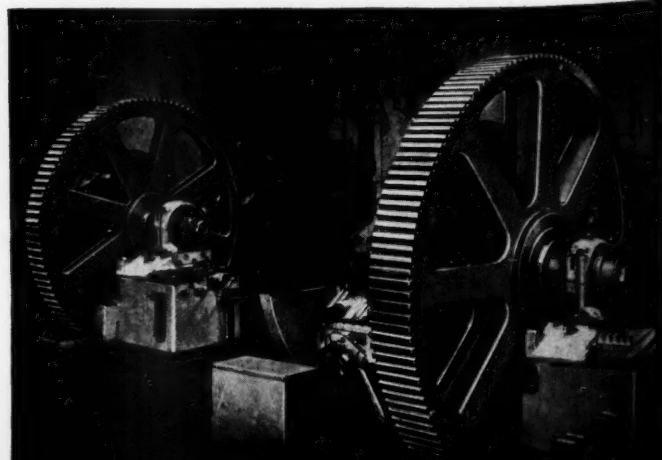
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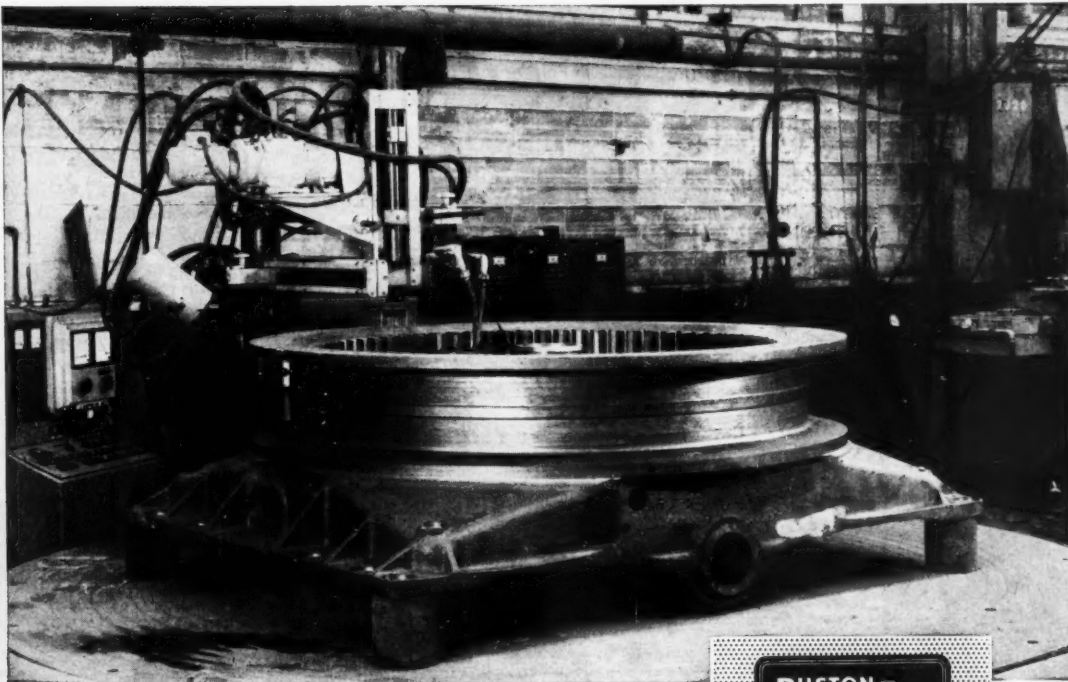


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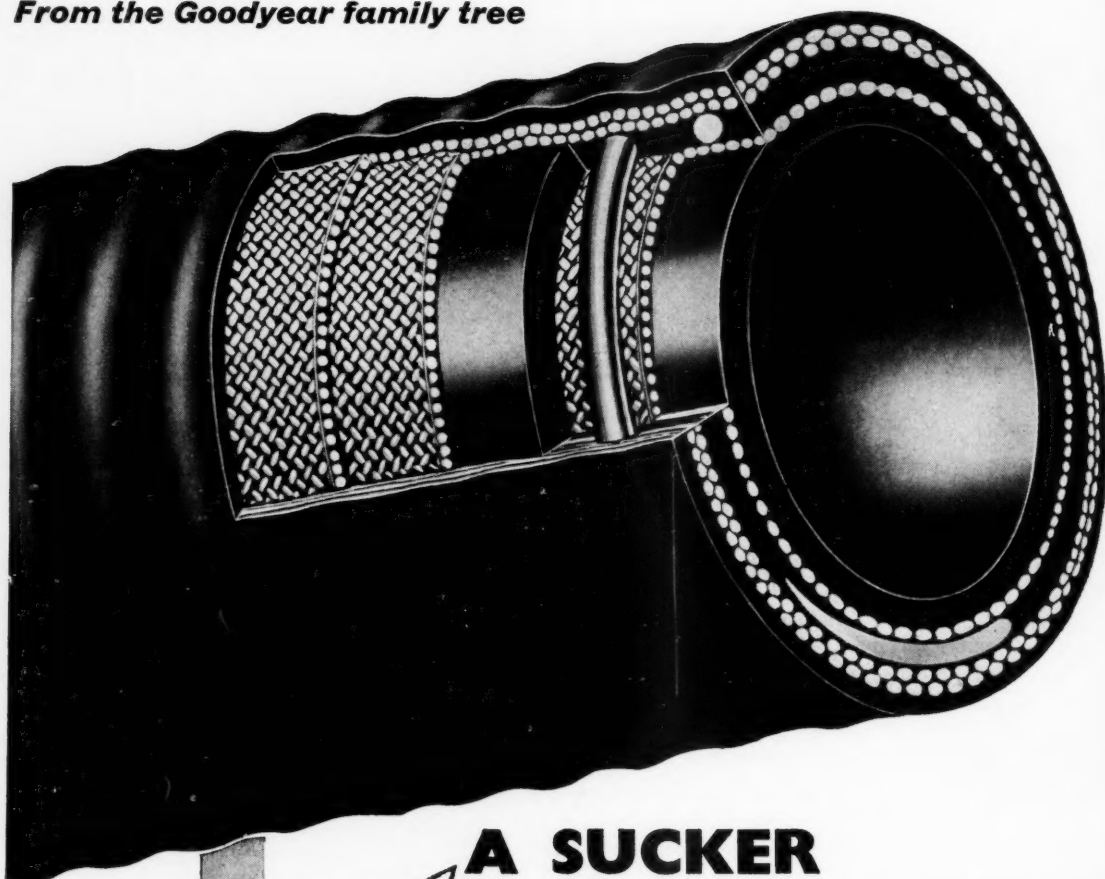
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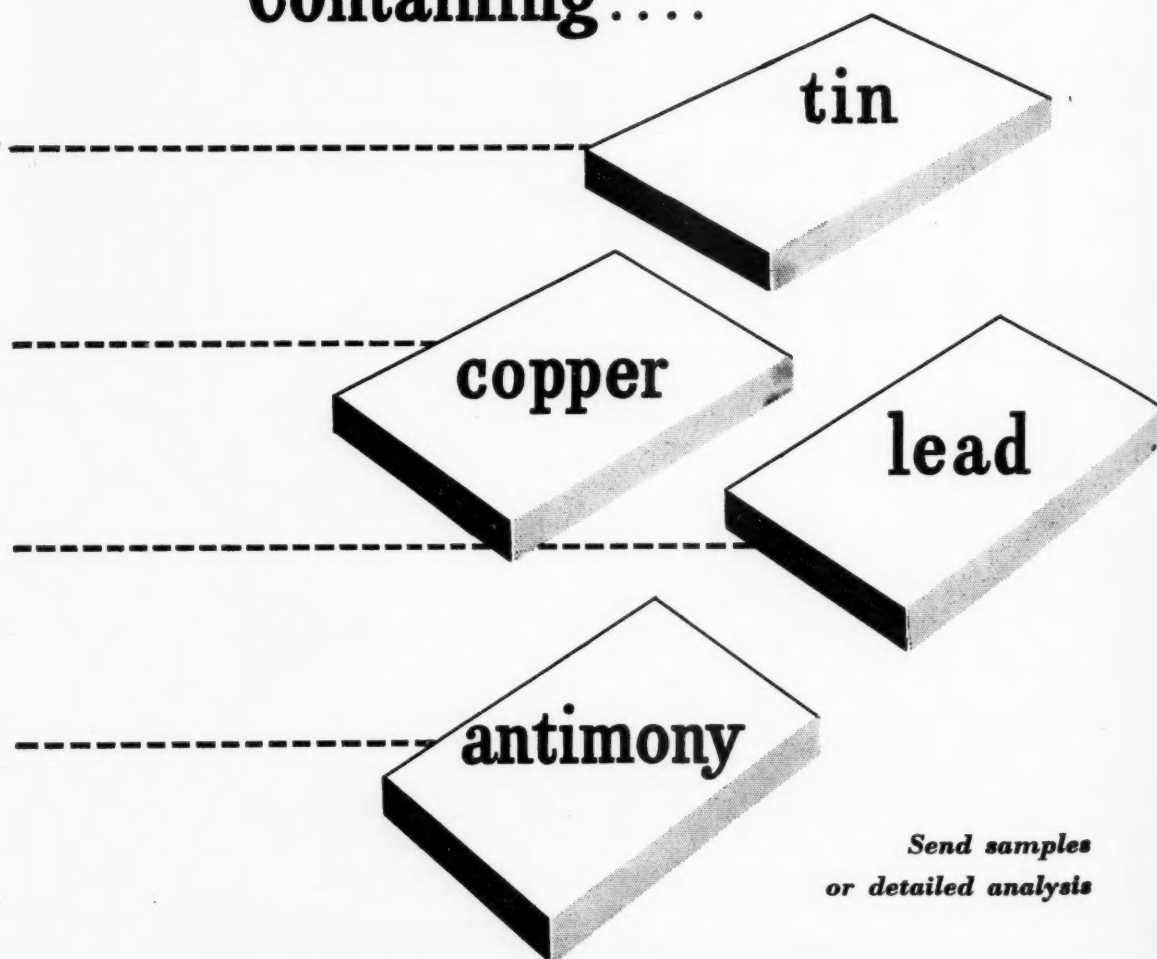


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The Mining Journal

London, March 4, 1960

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U.S. Concern Over Cuban Nickel

CONCERN is felt in the United States as to the recent visit to Cuba of Mr. Mikoyan, Deputy Premier of the U.S.S.R., in relation to the deposits of nickel and cobalt being developed and processed in Cuba. Apart from the U.S. Government, whose nickel processing plant at Nicaro is up for sale to a private bidder, Freeport Sulphur and Bethlehem Steel both have long-term leases or own outright extensive deposits of nickel and cobalt in Cuba. The development of nickel mining and processing in Cuba has been carried out almost entirely with U.S. Government and private U.S. investment funds.

It is not known whether Mr. Mikoyan and Sr. Castro discussed mineral deposits, but Mr. Mikoyan is reported as having openly stated that Russia approved the system of expropriation of foreign investments advocated by the Castro Government.

According to *The Wall Street Journal*, Cuba's revolutionary Government hopes to blend such incompatible elements as state capitalism, private U.S. and Cuban investment, and Russian equipment and know-how in an industrialization programme aimed at doubling national production within ten years. This seems to be the job assigned to a newly created agency called the Central Planning Board (Junta Central Plantificacion), which most businessmen at Havana seem to regard as a new instrument for the nationalization of nearly all industry in Cuba. One opinion quoted in the journal is that the only thing slowing down the take-over is a shortage of trained Cuban manpower and possibly the insistence of the United States that foreign owners receive fair and rapid payment for their properties.

Major Guevara, president of the National Bank and one of the Government's most left wing members, appears to be the prime architect of Cuba's economic planning. His proposal is that the Government should undertake the development of the basic industries, which he defines as steel, metallurgy, power, field and heavy industry. He is reported to have stated that private enterprise, in his opinion, would not be allowed to control new basic industries, but he refused to give any indication as to how this policy would affect such existing basic industries as the new \$100,000,000 plant of Freeport Sulphur's subsidiary, the Moa Bay Mining Co., or the \$80,000,000 Nicaro nickel plant owned by the U.S. Government. He has, however, been quoted as remarking: "I don't think anyone could say the establishments of the Nicaro Nickel Co. or Moa are an advancement for the Republic of Cuba. . . . They take their nickel and in Cuba remains a hole and a salary."

It remains to be seen how long the island's economic welfare will be subordinated to the tenets of this outmoded philosophy, for we find it hard to believe that the Cuban Government, even with Russian assistance, would be capable of running the Nicaro or Moa Bay undertakings, in view of the island's own limited resources of skilled manpower, while the latter is closely linked with Port Nickel, Freeport Sulphur's new \$45,000,000 refinery at Louisiana, U.S.A.,

which is capable of turning out 25,000 s.tons of nickel and 2,200 s.tons of cobalt a year from Cuban ore. Moreover, nickel is of little value to Cuba, other than as a bargaining counter, without markets, and Russia of all countries, whose mine production for 1958 was placed at around 50,000 tonnes, equivalent to nearly one-quarter of the Free World output, is unlikely to be a buyer.

So far Port Nickel still awaits the arrival of shipments from Cuba. Construction delays at the Moa Bay end have been partly responsible for the hold-up, but a number of other factors have made Freeport hesitant to start shipping sizeable quantities of Cuban ore, although we understand that nickel slurry production is continuing. In the first place there is Cuba's new 25 per cent tax on all minerals exported, which was introduced in October last year. Then there are the threat of expropriation and the possibility that Cuba might insist in buying Moa Bay's output for pesos and returning it to Freeport in the form of dollars. The Nicaro plant operated last year at about 70 per cent of capacity, but the terms of the Government to Government agreement under which it is operating are subject to adjustment under Castro's new tax programme.

Possibly commonsense may yet triumph over political fanaticism. Meanwhile, however, it would clearly be unwise to regard Cuban nickel as a dependable factor in the supply-demand equation. In the present unhappy circumstances the United States is indeed fortunate in having the world's largest known sources of nickel at her doorstep in a friendly and politically stable country.

MINING DEVELOPMENTS IN CHILE

Mitsubishi Shoji Kaisha, of Japan, recently formed a subsidiary Chilean company, Compañía Minera de Atacama, Ltda., to exploit its iron mines at Las Adrianitas, in Atacama province. Already work has started in the construction of a 54-kilometres road between the mine and the loading port of Calderilla, where mechanized loading facilities will be erected. The road will eventually be paved. The same company is building in Japan two ore-carrying boats, with 35,000 tons capacity each.

The annual production of Las Adrianitas is calculated at 300,000 to 500,000 tonnes. The ore will be carried to Calderilla on 60-ton trucks. It will be all shipped to Japan. The total investment in this project adds up to over \$U.S.7,000,000. Of this amount, \$U.S.1,575,000 correspond to the purchasing price paid for the mine, \$U.S.1,114,000 to construction costs, \$U.S.3,597,000 to machinery and equipment, and some \$U.S.873,000 to operating capital.

About 80 per cent of the machinery, trucks and other equipment required for operating the mine has already been imported, while the remainder is expected to arrive before April of this year. The Calderilla port is expected to be ready by the end of May. The first ore boat should arrive at Calderilla sometime in August, 1960.

The Caja de Crédito Minero, CACREMI, will invest this year E° 1,330,950 in modernizing its plants in the northern provinces of Tarapacá, Antofagasta, Atacama and Coquimbo. Of this, E° 215,000 will be spent on the E. de Bordos plant, E° 130,000 on the Illapel plant, E° 399,200 on the Osvaldo Martínez plant, E° 401,750 on the Pedro Aguirre Cerda plant and E° 175,000 on the Domeyko plant. E° 10,000 will be spent on road construction and maintenance. The Escudo (E°) is worth about U.S.\$0.95. The activities of CACREMI in advancing funds to small and medium miners, against future ore deliveries, will be continued at a high rate. Advances made during 1959 were almost triple those of 1958 (E° 832,000 against E° 308,000).

The Empresa Nacional de Fundiciones (National Smelters Co.) has announced plans to lend up to U.S.\$2,500,000 to local mining companies, to enlarge their ore treating plants.

Other specific projects that ENAF will carry out in the course of 1960 are the following: (a) Copiapó housing development, budgeted at E° 330,000 (b) studies and preparation of Teresita mine, with a budget of E° 206,000 (c) construction of Paipote flotation plant, at a cost of E° 751,350 (d) Construction of Paipote lixiviation plant, at a cost of E° 446,600 (e) mechanization of Caldera pier, budgeted at E° 258,500.

The Corporación de Fomento a la Producción (CORFO) has included in its budget E° 200,000 for making geological studies in Tarapacá province.

The studies to be effected include a survey of the Cordillera de la Costa, from Pisagua to the southern limit of the province. In order to avoid duplication, the survey made by ENAP (Empresa Nacional del Petróleo) will be used wherever possible. Other work includes:

(a) Survey of mining possibilities around Mamiña and Quebrada Tarapacá. (b) geological survey of the Andean region East of Arica. (c) preliminary mining survey of the region around Huatacondo.

All of this work will be financed by CORFO, and it has no relation to the United Nations Special Fund geological survey to be started this year.

RUSSIA'S MANGANESE DEPOSITS

The announcement by the Soviet authorities of the opening of the two new manganese ore mines and concentration units at Chiatur, as well as a special ore concentration plant for the processing of poor-quality ore from old mines, marks yet a further step in the development of the manganese ore industry in the Soviet Union, for decades the world's main producer. Russia's output, at the latest estimates about one-half of that for the whole world, is—like that of chrome ore—to be built up further in the future, both for the meeting of increased demand by domestic industry and for expanding exports.

The main deposits of manganese ore in the Soviet Union are located in the Ukraine. The huge deposits in this area in the Nikopol region have only recently been appreciated, as to their size and worth, by the authorities. The Nikopol deposits cover an area of about 500 square kilometers and, located in the sediment of the tertiary formation, consist of ores of both manganese oxides and manganese carbonates. The total volume of the Nikopol deposit is said to be well over 1,000,000,000 tonnes. Another discovery in recent years was that of a deposit at Bolshoe Tokmakovskoe, also in the Ukraine, comprising 1-2½ m. thick and 2-7 km. wide in a 90-km. long strip estimated to contain between 800,000,000 and 1,000,000,000 tonnes; however, the ore here is almost wholly of poorly-workable carbonates.

Considerable ore exploitation is carried on the Black Sea coast in the region of the new Chiatur mines and processing units, and despite heavy working in the past the area still seems to hold much promise for the Russian manganese industry. Recent estimates put reserves at some 185,000,000 tonnes of oxidic and carbonatic ores. Main advantage of these Georgian deposits is their excellent situation for shipping and transport.

In the mineral-rich Urals, a large number of small installations and mines are worked. Recent exploration has led to the discovery of several larger deposits in the central Urals in a 150-km. ore belt of both oxides and carbonates. Deposits in the Urals are of sedimentary and hydrothermal types, sometimes combined with magmatic rock. Combined reserves of the main sites at Yurkinskoie, Losvinskoie, Beresovskoie, Yushno-Beresovskoie, Polunochnoie, Marsyatskoie, etc. are estimated at 50,000,000 tonnes. Most of the Urals manganese ore is used by the local ferrous metals industry.

Recent discoveries of manganese ore in Kazakhstan are forming part of the base for setting up a large-scale ferrous metals industry in the Kazakhstan Republic. Deposits at the

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two main sites of Jezdinsk-Ulutau and Atasu in central Kazakhstan amount to a combined total of some 45,000,000 tonnes. Reserves have also been uncovered in Guryev Province on the Caspian coast, where orebodies 5 to 50 cm. thick were located in an area of 35 sq. k., but have not yet been evaluated as to their economic potential.

In the central Asiatic republics of the Soviet Union many smaller deposits in Silurian sediments have been discovered, among them the Dautyshskoie, Kysyl-Bairakskoie and Tachta-Karachinskoe deposits. Ore concretions and manganese-content sands have been found in many areas, leading among which are sites at Kara-Tengir, Asun-Bakir, Mazar, and Kara-Alma.

The supply of manganese to the industrialized west Siberia was a considerable problem until deposits of ore were discovered on the river Uza but these have a manganese content of only about 20 per cent. The deposits, which include both carbonates and oxides (the latter being the richer), are said to total some 98,000,000 tonnes and the processed manganese is intended mainly for the Kuznetsk iron and steel combine. There are only a few other deposits in Siberia, these being situated in central Siberia and in the Buryat-Mongol autonomous republic. In the Russian Far East, some 11,000,000 tonnes are to be found in the Chingan area but these—metamorphosed Cambrian sediments—are said to require complicated and expensive processing.

LATIN AMERICA'S FREE TRADE ZONE

A few days ago an agreement providing for the establishment of a Free Trade Association for Latin America was signed at Montevideo by the Foreign Ministers of seven nations. This pact paves the way for the removal of tariff barriers and the gradual creation of a free trade zone covering most of the South American continent and Mexico. The implications of this movement were discussed in our issue of May 22, 1959, pp. 551 and 552, in which the objectives of the proposed common market were briefly outlined.

The newly signed treaty does little more than set out the basic goals and procedures and its effectiveness depends largely on negotiations which have yet to come. Essentially it calls for the gradual reduction and eventual abolition over a 12-year period of tariffs and customs barriers on most goods traded among the signatory nations. Concessions on specific items are to be negotiated annually by the member countries on a reciprocal basis. At the end of this period the benefits of tariff reductions, which are expected to average 8 per cent a year, would be shared automatically by all the contracting nations.

The seven countries which have signed the treaty are Argentina, Brazil, Chile, Mexico, Paraguay, Uruguay and Peru. It is hoped, however, that other South American nations will also join the *bloc*. Bolivia, in fact, was expected to become a foundation member, but changed her mind at the eleventh hour, on the grounds that the situation of the less-developed nations had not been sufficiently considered. It has been suggested, however, that this decision may have been due to internal political factors and that after her forthcoming elections Bolivia may become the eighth signatory.

The sessions at Montevideo were also followed very closely by observers from Colombia, Venezuela and Ecuador, as well as by the International Monetary Fund and the United Nations. On account of its powerful oil interests Venezuela is expected to remain a separate entity, but Colombia is expected to join within the next few weeks. Several nations in Central America are negotiating a similar but separate agreement.

The economic integration of Latin America is potentially of great significance not only to the countries concerned but

also to exporters in the United States, Britain and elsewhere. Historically the greater part of the region's trade has been with the United States and Europe. This has been due partly to the fact that the Latin American nations have been predominantly producers of raw materials, dependent on overseas sources for their supplies of manufactured goods, and partly on account of the geographical barriers separating most of these countries and the limitations of transport and communications.

Now small but growing industries are developing in various Latin American countries, notably Mexico, Argentina and Brazil. The proposed common market, if and when it materialises, will give an impetus to interzone trading and to the development of secondary industries and should encourage foreign manufacturers to set up production facilities within the area. It should thus have the effect of enabling those countries with limited financial resources to conserve more of their foreign exchange for purchases of machinery and capital equipment rather than finished consumer goods, which is one of the aims of the new scheme.

It is obvious, too, that economic integration will enormously increase the bargaining power of the region and assist individual countries to secure loans that are urgently required for the improvement of transport and communications, the construction of dams and power stations, the development of secondary industries, and last — but by no means least — the expansion of mining and smelter production. Within a few months the first loans should start flowing from the new \$1,000,000,000 Inter-American Bank, to which the United States is contributing \$450,000,000 initially. So far Latin America has received only some 3 per cent of the global aid that has flowed from Uncle Sam, but President Eisenhower's present visit to Brazil, Argentina, Chile and Uruguay indicates the likelihood of a more open-handed policy towards the region, to which growing Russian interest in the sub-Continent is doubtless contributing.

The establishment of the new trading *bloc* will also give greater force to the pressure from Latin American countries for United States endorsement for international price fixing agreements on such commodities as copper, lead and zinc and for the removal of quota restrictions on the two latter metals. In Chile, for example, President Eisenhower will be told that a one-cent drop in the price of copper costs the government \$5,000,000 to \$6,000,000 a year, and that industrial expansion cannot be properly planned when national incomes are subject to such unpredictable variations.

The Latin American Free Trade Pact is unlikely to have much immediate impact on world trade. In the first place, it will not become effective until it has been ratified by legislators in at least three of the signatory countries. Though no political difficulties are anticipated, the process of ratification is likely to take several months at least. Thereafter hard and protracted bargaining can be expected as tariff reductions on specific items are discussed.

It is evident, however, that the establishment of a vast common market embracing predominantly mining and agricultural nations, lubricated as seems probable by an immense inflow of loans and grants from U.S. and international sources, presents a stimulating challenge to British exporters and to none more so than to manufacturers of mining machinery and equipment. It must be expected that the market will always remain a highly competitive one. Apart from the dominant part played by American capital in opening up some of the major mining fields, Japanese and German interests are becoming increasingly active in the region, while the possibility of large sales of Chilean copper for Soviet machines to re-equip Chilean copper mines has recently been mooted in Moscow. Nevertheless, as suggested in our previous article, this huge collective market might well prove rewarding to those British exporters who are prepared to spend time and money on first-hand investigation of its opportunities.

COAL MINING IN PAKISTAN

THE coal of Pakistan belongs to the lignitic, immature coals, with high ash and sulphur content, but it is good enough for a variety of purposes in Pakistan, and by using it whenever possible, considerable amounts of Foreign Exchange are saved.

Coal is found in the following areas :—

- a Makerwal,
- b Quetta/Kalat area,
- c Salt Range,
- d Jhimpir (Sind).

The best grade of coal is found in the Makerwal Colliery, and the next best is to be found in the Quetta/Kalat area. This latter area produces most of the present-day production of Pakistan.

Makerwal

The Makerwal mines are situated on the western edge of the Punjab, on the west bank of the Indus, about 70 miles due south of Peshawar. A light railway some 60 miles in length, connects the mine to the broad gauge of the main railway system, at Mari-Indus, after crossing the Indus from Kalabagh village. The mine has been operated by the government-sponsored company, Pakistan Industrial Development Corporation Ltd., since 1952. The total output from this mine goes to the fertilizer factory, and the cement factory near Doud Kel, both of which are operated by the same corporation.

The mining operations extend along the face of an escarpment which rises to between 2,000 and 3,000 ft. from the river plain. This escarpment is related to the Salt Range escarpment, which extends for miles on the eastern side of the Indus. The coal outcrops near the top of the escarpment and has been mined down the dip to water level. The coal is carried down from the workings to the plain below, by self acting ropeways. These usually take one 'tub' at a time, but one takes two at a time.

The P.I.D.C. at Makerwal had the advice of Powell Duffryn Technical Services in 1950, and the mining has been carried out since 1954 under the direction of German mining engineers. As a consequence, the mining operations at Makerwal are the best of the coal mines of Pakistan. A low level adit is being driven from the plain level, to intersect the coal. Progress has been slow, but when completed it will open up large reserves of good coal. In the meantime production is mainly from recovery of old pillars. The production is stated to be about 450 tons per day.

Quetta/Kalat

This area lies in the states of Baluchistan and Kalat. Quetta itself is 250 miles west of the Indus at Multan, some 650 miles from Karachi by road, and about 40 miles due east of the Afghanistan border. It lies at 5,500 ft. above sea level. Quetta is the headquarters for this area, and is served by a single line railway—broad gauge—which has to climb through a steep graded pass known as the Bolan Pass.

This area is sub-divided into three zones : a Sor Range/Deghari ; b Khost/Sharigh ; and c Mach.

By C. HARVEY RICHARDS, A.C.S.M., M.I.M.M.

The Sor Range/Deghari zone is the closest to Quetta. The coal measures outcrop in a massive limestone range which runs practically north-south, and which rises to nearly 8,000 ft. The range is covered with snow for many months in winter. The range lies east of Quetta township. The coal outcrops near the top of the east side of the range, which is so steep that it is to all intents and purposes an escarpment. The mines of the north end and the central portion of the range are reached by 17 miles of poor road around the north end of the range. The mines in the Deghari sector are reached by poor road from Spezand railway station, well to the south of the range. Coal is taken to the stations by lorries, in bags, usually 4 to 5 tons on a 2½ ton lorry, and is screened at the railway stations.

The Khost/Sharigh zone lies east from the Sor range. The coal again outcrops high up on a mountain range. This zone was one of the earliest areas worked for coal, by the railways. It is served by a single line branching off from the line to Quetta, at Sibi. The coal is considered to be of good quality.

The Mach zone lies between Sibi and Quetta and in fact lies at the foot of the Bolan Pass. The coal is found on both sides of the railway line. The area on the north side of the line is highly faulted and produces a small amount of coal. The area on the south side of the line has hardly been touched.

Salt Range

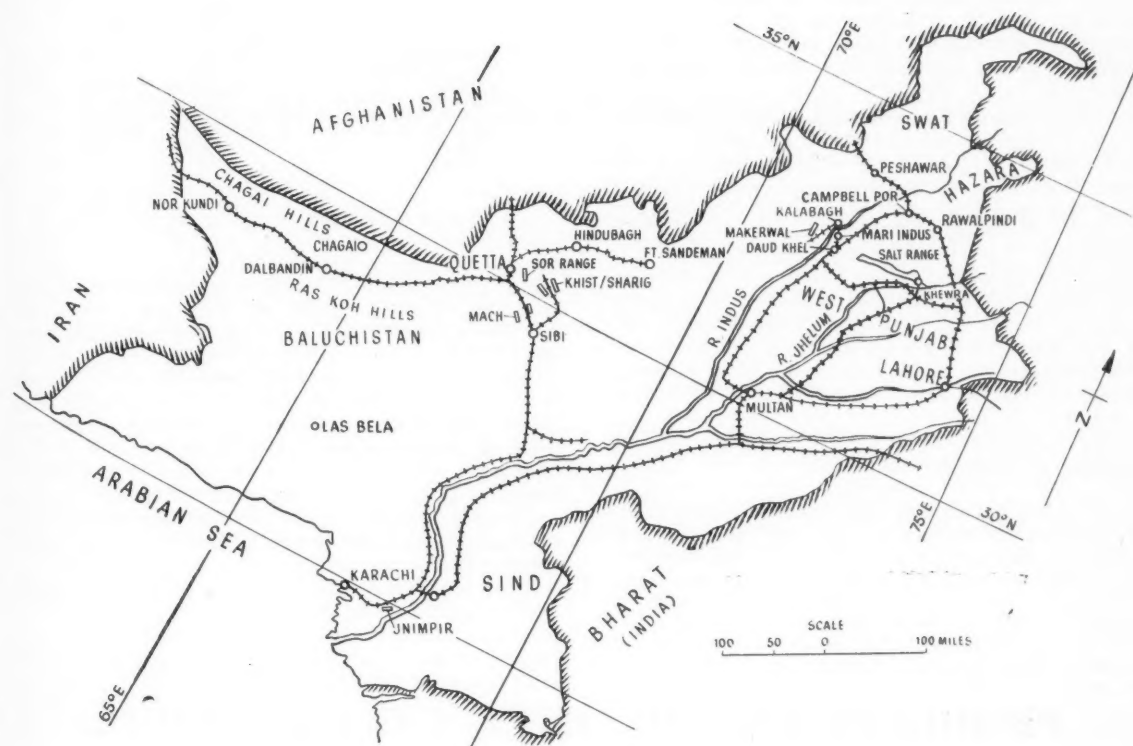
The Salt Range lies roughly east-west, between the Jhelum river on the east, and the Indus on the west, and is some 70 miles due south of Rawalpindi. It takes the form of an escarpment on its south side, overlooking the main river plain. It rises to 2,000 ft. in places, and slopes away gradually, towards the north. The coal outcrops on the escarpment. It is of very poor quality, and inferior to that found in Baluchistan or Makerwal. The production is low, and mainly used by brick kilns. Local cement producers import coal from Baluchistan when possible, but on occasion use the local product. This field has not been fully explored, and this is now under consideration, with the help of U.N.T.A.B.

Jhimpir (Sind)

This area lies 75 miles from Karachi. There is very little activity in this field at the moment. The coal is very inferior, and is in very narrow seams. A more detailed examination of this area is about to be undertaken by the P.I.D.C. and The Geological Survey of Pakistan.

Mining methods and conditions

Coal seams through the country are on the whole, narrow, an exception being at Makerwal, where thicknesses of up to 7 ft. have been met. Elsewhere, the thickness varies from



Sketch Map of West Pakistan

4 ft. in the Sor Range, to just over 1 ft. in the Jhimpir area. Mining of coal in Pakistan has been carried on for some years. In both world wars interest was stimulated by economic necessity arising from war conditions. Before Partition, the only colliery worked as a commercial enterprise, with success, was the Makerwal mine. During the wars the railway authorities were instrumental in opening up coal mines in the Khost-Sharigh area and to a lesser extent, in the Sor Range. Operations other than those of the railway were mainly pickings by small workers, along the outcrops. With the advent of Partition, and the difficulties between the two New Countries after that event, the flow of coal from India to Pakistan came to an abrupt end.

This led to a mad scramble for indigenous coal. The men who had some knowledge of the outcrops, naturally, led the scramble. Pits became deeper, and every effort was made to avoid the expense of supporting the workings. This meant that there developed a series of twisting, cramped holes in the ground with no regard for ventilation or safety. The main idea was to get coal. Production was increased by increasing the number of holes. The method of extraction was the ancient one of room and pillar. Pillars of about 45 ft. square are made by cutting away coal from around it to a width of from 5 to 8 ft. The coal is brought to the surface on men's backs, in gunny sacks. The holes are so cramped that these men can rarely stand upright. These conditions have been the rule rather than the exception up to the present time, but steps are being taken to try and change it. The coal is friable by nature, and as no man is likely to be keen on carrying lumpy coal on his back under the conditions prevailing, the percentage of fines is high.

This haphazard mining has brought the natural consequences in its train, and there have been roof falls, fires and explosions, which have caused the loss of large reserves of coal and lives.

Lack of Mining Engineers

Pakistan lacks sufficient trained mining engineers to serve the present needs. At the moment the industry is run by "Sidars". These are overseers graduated from the worker ranks; their knowledge is entirely local and their experience has been gained under the atmosphere of "coal, more coal". They do their best but that is very limited.

Mining regulations exist, modelled on those existing in the sub-continent before Independence. There are, however, only two qualified mining engineers acting as mine inspectors for the whole country. Their task is made all the more difficult by the lack of engineers at the mines, lack of staff of their own to give closer supervision, and what is worse, they have not always, in the past, been able to press home their prosecutions for breaches of regulations, with satisfaction. The inspectorate, moreover, is under the Commissioner for Labour and Welfare. This leads to failure to appreciate the full seriousness of lack of enforcement of strict engineering discipline.

This lack of engineers has been exercising the minds of the government, recently. At Lahore, the College of Engineering and Technology has been running a mining course under the direction of Professor Bernard W. Holman. The number of graduates turned out varies from 12 to 15 per year. The first batch graduated in 1957. This is a step in the right

direction, but not enough, and the Bureau of Mineral Resources is now studying the possibility of establishing a full scale School of Mines to improve on the present output. There are a few qualified engineers, but most of them are employed in the organizing of the Bureau of Mineral Resources.

The haphazard methods of mining described above do not apply to Makerwal Colliery. Fortunately, the bad mining can be limited to about 600 ft. at which depth the seams pass beyond the lease boundaries. Future deep level development of the Sor Range will very likely be under the direction of the P.I.D.C., which means satisfactory methods of mining will be introduced. This will still leave a large number of small operators who need guidance, and here is room for consulting and instructing engineers. Some of these small workers are trying to improve their working methods, but have little idea of what they are aiming at. The Bureau of Mineral Resources may be able to help with advisory engineers in due course, but they have none available for this work at the moment.

Programme for Doubling Coal Output

It must be admitted that the mines have suffered from lack of foreign exchange with which to purchase equipment, and the Bureau is taking steps to overcome this. On the other hand it is said that when this exchange was available, in the

Coal Production for 1958 (by areas)

Area	Tons produced	Total Tons
Makerwal Mine	136,220	136,220
Sor Range/Deghari	312,810	
Mach	73,960	
Khost/Sharigh	40,870	427,640
Salt Range	146,560	146,560
Jhimpir	17,330	17,330
Others	17,770	17,770
	745,520	745,520

past, it was used for other purposes. The Bureau is aiming to double the present production of coal in 5 years. This will not be an easy task as the programme includes the development of two 1,000 t.p.d. units in the Sor Range through two tunnels of over 5,000 ft. in length, and increasing the Deghari mine from the present 120 t.p.d. to 500 t.p.d.

The Bureau, although only in existence for a few months, is already showing results. It has focussed attention on the poor roads serving the mines, the lack of central power supply, and the future railway requirements. It has also introduced stricter terms in the conditions attached to mining leases, which are hoped to have a restraining effect on bad mining.

(To be concluded)

PRODUCTS OF THE RARE EARTH GROUP

THE outstanding feature of the rare earth group is the chemical similarity of its members, this in turn being due to the unusual similarity of the basic electronic structure of their atoms. The lanthanons all have a xenon atom core and all have three electrons in their outermost electronic levels, which are primarily responsible for their chemical properties. They thus differ only in the number of electrons in the intermediate levels. Scandium and yttrium atoms also have three outer electrons but possess argon and krypton cores respectively.

The close similarity in chemical behaviour of the rare earth group of elements has made their separation an unusually difficult problem. Until recent years they were available only in very small quantities with relatively low purity and at extremely high cost. As a result of work done in the United Kingdom, in the Johnson Matthey research laboratories and elsewhere, on the application of ion-exchange techniques to rare earth separation, quite large supplies of the rare earths have been made available at much lower cost.

The group comprises scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium.

All these elements, except element 61, can now be supplied in a state of high purity, not only as oxides and salts but also in the metallic state.

Properties of the Oxides

In spite of the chemical similarity of the elements, the pure oxides display many special characteristics and are rapidly showing signs of finding important industrial applications.

All the oxides except CeO_2 are soluble in dilute mineral acids, the solubility decreasing in general with increase in atomic weight. The basicity of the oxides in the lanthanon

group decreases and the density increases with increase in atomic weight.

Pure europium oxide, Eu_2O_3 , fluoresces pink under ultra-violet radiation, and pure terbium salts, but not the oxides, fluoresce a bright green.

All oxides are available in a state of high purity, and most of them are available also in lower grades at correspondingly lower cost. Salts of all the rare earth elements can be prepared to meet individual requirements.

Rare Earth Metals

New techniques for the production of the rare earth elements in a state of high purity have been developed in the Johnson Matthey research laboratories. Common metallic impurities are held at a very low level. The impurity content of other rare earth metals is generally of the order of 0.1 per cent. In scandium, lanthanum and cerium the rare earth metal impurity is confined to less than 0.01 per cent.

All of the sixteen metals have been remelted into ingots or rods. Lanthanum, cerium, neodymium, praseodymium, yttrium and gadolinium have been successfully extruded, and subsequently drawn to fine wire.

Lanthanum, cerium, praseodymium and neodymium oxidize readily at room temperature and must be preserved in airtight containers, but all the other metals, except europium, acquire no more than a superficial tarnish on prolonged exposure to the air at room temperature. Europium is highly reactive and therefore difficult to preserve and handle as metal.

A publication issued by Johnson Matthey & Co. Ltd., and entitled *Products of the Rare Earth Group* describes the properties, characteristics and availability of this potentially valuable and very topical range of materials. It is available on request from the company's head office at 73-83 Hatton Garden, London, E.C.1.

Helicopter Operations in Canada

ABOUT 10 years ago, as Survey parties were being assigned to more and more remote northern areas with extremely short field seasons, it became apparent that the Geological Survey of Canada was faced not merely with a long laborious task but, rather, with a task hopelessly beyond the capabilities of the field methods then in use, writes C. S. Lord in an introductory chapter. That task was to complete, at an early date, an economical and otherwise acceptable geological reconnaissance of Canada. The facts to be faced were that, after more than a century of effort, only about a third of Canada's 3,600,000 sq. miles of land was mapped even on reconnaissance scales, and that conventional field work in increasingly remote areas was rapidly becoming prohibitively slow and expensive. Yet there was no denying the urgent need for a complete geological reconnaissance if the obviously imminent exploration, development, and exploitation of the North was to proceed in an orderly and efficient manner. A radically new field technique was clearly required. Helicopters promised to provide the basis for that new technique. They were tried, successfully, in 1952, and their experimental use at that time now appears to have marked the beginning of a new era in the reconnaissance geological mapping of Canada.

General Policy

Overall policy that guided the adoption and development of the helicopter technique was that these aircraft would first be used in areas presenting the minimum of operational and terrain problems so as promptly and surely to demonstrate their suitability and to build up operational experience; and that thereafter the technique would be adapted, in so far as practicable, to the more difficult conditions of other large, unmapped parts of Canada.

The relatively accessible, low-relief, barren grounds of southern District of Keewatin were selected for the Survey's trial helicopter project known as Operation Keewatin (1952). Operating conditions there were almost ideal for these aircraft. The experience and lessons of this initial thoroughly successful Operation were applied to the planning and conducting of Operation Baker (1954) and Operation Thelon (1955) in similar but slightly more remote parts of North-west Territories mainland. These surveys were entirely within the Canadian Shield. The two helicopters of each project (two Hiller 360 on Operation Keewatin, and two Bell 47D-1 on each of Operations Baker and Thelon) were used solely as low-flying observation platforms, enabling the geologists to make their observations from aircraft rather than from canoes or on foot. Where critical detail was required the geologists were flown slowly within a few feet of the ground, or were landed and made observations on foot. The aerial traverses radiated outward from each operating camp. About 185,000 square miles were mapped by the three Operations, at an average cost of about \$2.63 a square mile. Several advantages of this form of the helicopter technique in this part of Canada were immediately apparent. The short open-water field season was successfully extended to include the break-up period and the ideal operating period immediately preceding it. Co-ordination and uniformity of geological coverage were much better than attained in any practicable system based

on canoe transportation. All geological observations were made by experienced staff geologists. The work performed in three field seasons would otherwise have required 40 party-years, and it was completed at significantly less cost than would have been practicable by conventional methods.

Operation Franklin

Operation Franklin (1955), whereby 100,000 square miles within a 200,000-square-mile area of the Queen Elizabeth Islands were mapped for publication at 1 inch to 8 miles, presented requirements and problems radically different from those of Operations Keewatin, Baker, and Thelon. The underlying rocks are mainly sedimentary strata. Altitudes range from nearly horizontal to steeply inclined. Many of the stratigraphic and structural features are displayed with unique clarity on aerial photographs. Detailed studies of stratigraphy and structure at appropriately distributed localities, combined with airphoto interpretation, thus promised to provide geological data appropriate to the scale of mapping. Aircraft were needed for transport of geological parties to points selected for detailed study, and for moving base camps. They require range and load-carrying ability commensurate with the area under survey, and had to be capable of landing where and when required on islands devoid of lakes or landing fields, and separated by sea and ice conditions that varied widely from time to time and place to place. Fixed-wing aircraft or light helicopters failed to meet these requirements and two Sikorsky S-55 helicopters were accordingly chosen and proved to be entirely suitable. These aircraft operated from mid-June to mid-September, without support from fixed-wing aircraft, from bases previously supplied by a DC-3 aircraft. Although the cost per square mile mapped was slightly more than \$3.00, this figure is not directly comparable with the cost of other projects because of the use made of the services of other government agencies; because the work was done on scattered islands with much non-productive flying over intervening sea areas; and because of other unique conditions.

In 1954 a Bell helicopter was used by a party assigned to urgent 1-mile mapping in northern Cape Breton Island. The area is wooded and mainly inaccessible by any conventional means other than laborious back-packing. The aircraft was used mainly to transport geologists to and from their places of work and the time thus saved enabled them to do in one season what would otherwise have required four to six. This was the only occasion on which the Survey has used a helicopter to support detailed geological mapping.

A 30-day trial of helicopter-assisted 4-mile mapping in the mountains of Western Canada was made in 1954 in the Pitt Lake map-area near Vancouver. The experience so gained was then applied in planning Operation Stikine (1956) whereby a 52-man party supported by two helicopters, one to two fixed-wing aircraft, and pack-horses, mapped the geology of about 25,500 square miles of north-western British Columbia for publication on a scale of 1 inch to 4 miles. The area surveyed includes parts of the Coast Mountains, the Interior Plateaux, and the Cassiar Mountains. The project was organized as five separate mapping parties and an administrative party, each equipped with two-way radio.

Each field party adopted an organization and working technique designed to fit the peculiar geological and physical requirements of the area allotted to it. Aircraft, both fixed-wing and helicopter, were used primarily as a means of transport and supply, and only incidentally for directly gathering geological information. The area was mapped at several times the pace, in terms of geologist-seasons, of any previously available field method, and at comparable or less cost. The standard of accuracy and detail of the map produced is more erratic than it would have been had the mapping been done more slowly by a number of smaller parties working by conventional methods. This was due, at least in part, to difficulties inherent in a large, complex, rapidly moving organization engaged in a "crash" programme aimed at starting and completing an involved project in one field season. Current plans for other major helicopter-assisted projects in the western Cordillera are to extend these projects over two or more field seasons, to obtain readily accessible and key geological data during an initial reconnaissance season with support from light relatively inexpensive, fixed-wing aircraft, and thereafter to make full use of helicopters to map rapidly the remaining less accessible areas by applying the key data obtained during the previous reconnaissance season. These proposed modifications are expected to result in better economy and increased quality, at some sacrifice in speed.

Operation Mackenzie

In 1957, in line with the continuing policy to adapt the aerial technique to as many as practicable of the very large unmapped areas of Canada, a helicopter project known as Operation Mackenzie was assigned to the upper Mackenzie River basin and adjacent mountains. Much of the area is heavily timbered. The geological requirements were those of a potential oil and gas area. The objectives were thus to obtain and collate precise stratigraphic data from appropriate points throughout the area, and to prepare geological maps of the plains areas on a scale of 1 inch to 8 miles, and of the mountains on a scale of 1 inch to 4 miles. The two helicopters were used for two main purposes: traverses during which geological observations were made from the aircraft or during stops of short duration, and the movement of geologists and camp equipment to places where lengthy ground observations were required. The supporting Beaver aircraft, when available and where suitable, aided in these tasks. Field work started before break-up and extended throughout the summer. About 100,000 square miles were mapped, and approximately 225,000 feet of stratigraphic section measured and studied in detail. The cost, about \$1.68 a square mile, is the lowest attained by any major Geological Survey helicopter project. The survey provided more information in one season than the same number of geologists would have acquired in three or four seasons of conventional work; much of the information

accumulated would have been almost unobtainable by conventional means.

Operation Fort George, a modest version of Operations Keewatin, Baker, and Thelon, was started in 1957, continued in 1958, and was scheduled for completion in 1959. It is a start towards the reconnaissance of one of the largest unmapped areas of the Canadian Shield—New Quebec west of the Labrador Trough. It differed from previous helicopter projects in the Shield in that it involved one instead of two helicopters, employed three instead of five geologists, and mapped 35,000 instead of some 60,000 square miles each season. Furthermore, the formerly standardized system of radial helicopter traverses was abandoned in favour of a system whereby the aerial traverses were parallel and spaced at intervals of 6 miles. The operation has been highly successful, and unique in several respects. The costs, about \$2.03 a square mile, are the lowest so far achieved by a Survey helicopter project in the Canadian Shield. The use of only one helicopter and a relatively small party resulted in a highly flexible, readily co-ordinated project. Furthermore, by using only one helicopter, it was possible to assemble and compile geological data as rapidly as they accumulated. Thus, a month or so after the close of each field season, copy for a preliminary geological map of some 35,000 square miles was in the hands of the editor. Finally, the system of parallel traverses achieved excellent uniformity of geological coverage. On the other hand, an obvious disadvantage of using only one helicopter is the decreased rate of mapping.

Success of Helicopter Operations

Geological Survey experience with helicopters has not yet reached the stage where detailed comparisons are warranted between various projects, for the reason that these aircraft have to date been used intentionally under a wide variety of geological and operating conditions in an effort to develop techniques applicable to many parts of Canada. On all projects, the helicopters were supplied, operated, and maintained by commercial organizations under contract to the Department of Mines and Technical Surveys. In no instance was an operation seriously retarded by unserviceability of helicopters. All helicopter-supported projects have been thoroughly successful. Although the helicopter was in all cases the major operational factor contributing to this success, all projects made full use, where appropriate, of many other aids and techniques, including light and heavy fixed-wing aircraft support, dropping of supplies by parachute, photography, aeromagnetic reconnaissance, and the usual methods of geological mapping of the ground. It is encouraging to note, for what it may be worth, that the two most recent Operations, Mackenzie (1957) and Fort George (1957-58), have shown the lowest costs in terms of dollars a square mile mapped. There is little to suggest, from the operational problems and geological results of the seven major projects, that any overall advantage would be gained by using larger parties or more than two helicopters to a party. There is, on the other hand, some evidence that under certain conditions slightly better results at equal or less cost might be had from relatively modest parties of simple flexible organization, taking full advantage of a season or two of preliminary reconnaissance prior to the expensive helicopter phase.

In any event, the impact of the helicopter on the rate of reconnaissance geological mapping in Canada has been truly spectacular. In the period 1842 to 1951 the Geological Survey mapped more than a million square miles. From 1952 to 1958 field work was completed within nearly half a million square miles by seven major helicopter Operations—in addition to much other field work accomplished by some 530 party-years' effort. Thus, since 1952, the Survey's staff mapped about half as much of Canada as in the previous 110 years—due, in large measure, to the helicopter.

Helicopter Operations of the Geological Survey of Canada (Department of Mines and Surveys, Bulletin 54, price 75 c.) describes the organization, logistics, field techniques, and other operational features of the principal helicopter projects undertaken since the first trial in 1952, and points out lessons learned from some 4,600 helicopter-hours of flying required to map geologically nearly half a million square miles in widely separated and diverse parts of Canada.

Brazil's Nuclear Energy Programme

From Our Own Correspondent

THE foundation stone of the plant to obtain atomically pure uranium was laid at Pocos de Caldas, Minas Gerais, in January, on lands ceded by the state government. The installation, a project of the National Nuclear Energy Commission (CNEN), will be able to process 10,000 tons of ore annually, yielding 60 tons of uranium salts. Pure uranium will then be produced for use in nuclear reactors and a unit to industrialise the zirconiferous rejects will be installed on an adjoining site. Enriched uranium will be produced later in accordance with CNEN's programme.

The primary object of the plant is to supply uranium to research laboratories, of which the Radioactive Research Institute of Minas Gerais University maintains ten, including one of Nuclear Emulsions. The Institute has lately acquired the site for an experimental reactor, ordered in U.S.A., for training and research and to produce radioactive isotopes for scientific, medical and industrial use.

Agreements with U.S.A. permit CNEN to obtain enriched uranium for training and later for power reactors. Another agreement allotted six kilos of Uranium-235 for a reactor of the "swimming pool" type, with a thermic potential of five megawatts, built in United States for Sao Paulo University. The latter's Nuclear Physics Laboratory is equipped with a betatron, producing gamma radiation of 30,000,000 electron volts potential, and a Van der Graff accelerator, developing energies equivalent to 4,500,000.

As explained by its president, Admiral Octacilio Cunha, in a series of articles published by *Engenharia, Mineracao e Metalurgia* (Rio), the National Commission for Nuclear Energy was created in 1956 to develop the various applications of nuclear energy. In collaboration with the National Research Council, created in 1951, the Commission trains technicians and scientists, Brazil's crucial need at present, ensures adequate supplies of raw materials and promotes industrialisation. The utilisation of nuclear energy to produce electric power forms part of the future programme.

Raw Materials

As regards raw materials, prospecting is conducted by CNEN in co-operation with U.S. Geological Survey, the Brazilian Department of Mineral Production and the Research Institutes, Technological and Radioactive, of Minas Gerais and Sao Paulo. Two studies have been completed to date, namely those relating to industrialisation of monazite sands and the extraction of uranium from the zirconium deposits of Minas Gerais. Other studies, now proceeding, refer to the uraniferous minerals of Aguas da Prata, Sao Paulo, and Belo Vale and Serra da Moeda, Minas Gerais; the existence of uranium in the gold-bearing mineral of Jacobina, Bahia; the separation of uranium found in Parana coal and in the cretaceous arenites of Rio Roncador, Mato Grosso, and the extraction of uranium and thorium from the pyrochlore deposits of Araxa, Minas Gerais.

Industrias Químicas Reunidas (ORQUIMA) concentrates monazite sands and produces uranium and thorium salts exclusively for CNEN, chlorate and sulphate of rare earths for exportation and trisodic phosphate to make detergents. As a result of the prohibition to export uranium and thorium salts excessive quantities had to be stored by the Commission.

The problem was solved, at least partially, by restricting the mining of monazite sands and returning to ORQUIMA for processing the stocks held by the Commission, which amounted to 5,000 tonnes in 1958.

CNEN is now studying the possibility of producing commercially pure oxide of thorium as a preliminary to obtaining the substance atomically pure.

For the present the ore to be processed in the Pocos de Caldas plant will be the uraniferous zirconium which abounds in the region. Société Chimique de Produits de Terres Rares (Paris), at CNEN's request, drew up projects for two plants, one to separate the minerals chemically and produce uranium salts, the other to process the salts and produce metallic uranium. The projects were approved and a contract was signed with the Société to finance the purchase of the necessary equipment and provide technical assistance to instal it.

The ore will be a mixture of *baddeleyite* (ZrO_2) and *zircon* ($ZrSiO_4$), called *caldasite*. An exhaustive report on this mineral by Gene Tolbert, of the U.S. Geological Survey, was recently published in *Engenharia, Mineracao e Metalurgia*. According to the author, uraniferous deposits are scattered throughout the plateau within an 18-mile radius of Pocos de Caldas, but cluster chiefly in the Pocinhos, Cascata and south-central area. The ore generally occurs in alluvial and eluvial placers and in lenticular vein deposits. Selected samples and concentrates from all three areas ranged in grade from 0.13 to 2.0 per cent uranium, with an average of 0.50%, and from 60 to 85 per cent zirconium dioxide.

Thirty-three samples of commercial export-grade zirconium ore, i.e. 60 to 85 per cent ZrO_2 , from Pocos de Caldas were mixed together for chemical analysis and gave the following result: SiO_2 , 14.5 per cent; Fe_2O_3 , 4.7 per cent; TiO_2 , 1.1 per cent; P_2O_5 , 0.35 per cent; ZrO_2 , 70.0 per cent; U_3O_8 , 0.64 per cent.

Zirconium Concentrates

Most of the Pocos de Caldas zirconium properties are held by Companhia Geral de Minas, a subsidiary of Byington & Co., Sao Paulo. The company does not mine the ore, but buys it from contractors who do the actual mining. The greater part of the mining is still done with pick and shovel, the ore being transported by wheelbarrow, cart or lorry to washing stations, where crude concentrates are obtained by sluicing, hand-picking, sieving and hand jigging. At Pocos de Caldas, or Cascata, crude concentrates are further concentrated, crushed, graded, bagged and despatched. Approximately one-fifth of the concentrates received from contractors is low grade, with about 60 per cent ZrO_2 , and is sold to manufacturers of refractory cement.

According to the Statistical Service of the Ministry of Agriculture production amounted to 9,499 tonnes in 1958 and in that year 2,000 kilos were exported at an overall price of U.S.\$360, F.O.B. Santos, for a base of 75 per cent ZrO_2 and 12 per cent SiO_2 .

In view of Brazil's immense area (3,287,190 square miles), the diversity of its geographical divisions and despite the abundant reserves of hydraulic power, the Commission is convinced that nuclear energy offers the best means of solving the power shortage in many distant, or over-developed areas.

MINING MISCELLANY

Chamotte Unie N.V., of Geldermalsen, Holland, and the Continental Ore Corporation of New York have formed a limited liability joint subsidiary bearing the name of BASREF N.V. (Basic Refractories) in Geldermalsen. The new firm is owned 60 per cent by the Dutch firm and 40 per cent by the U.S. concern, and has an initial capital of 1,000,000 florins (about £95,000). It will undertake production of magnesite, chrome-magnesite and other refractory mineral products in a completely automatic plant starting next year, and will trade in these products.

Charbonnages de France, the French coal administration, reports that the financial situation of the French coal industry is satisfactory. The total balance of all pits at present shows, for the first time since 1951, no deficit, taking into account normal depreciation. Despite a fall in the E.C.S.C.'s coal production of 11,500,000 tonnes, the French coal industry, which employs 138,800 people, raised production. Although French coal stocks rose by 2,200,000 tonnes during 1959 and now total 11,500,000 tonnes, most of this is said to be ballast coal for the pits' own power plants. Charbonnages considers that France will not have to cut output until 1965.

Two Swedish firms, Grangesberg Co., and the state-owned Luossavaara-Kirunaavaara AB, have recently concluded a new iron ore contract with Western Germany, which provides for iron ore shipment of 6,750,000 tons during 1960, an increase of 1,000,000 tons on the 1959 contract.

Mr. H. H. Huestis, president of Bethlehem Copper Corporation stated in Vancouver recently that the Japanese Sumitomo group was interested in financing the Corporation's Highland Valley mine which was expected to go into operation by late 1962. Mr. Huestis said that the initial cost of putting the mine into operation would be about \$7,500,000, based on a daily mill capacity of 3,000 tons of ore, to be increased to 5,000 tons after two years. If Sumitomo arranged the financing, they would sign a contract for exclusive rights to the first ten years' production.

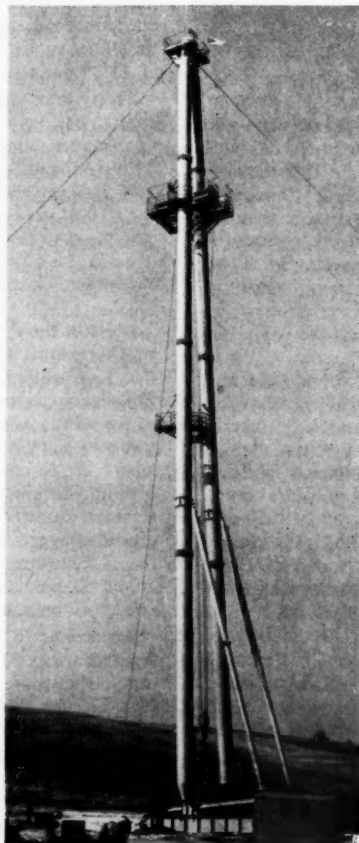
The Export-Import Bank is to make Turkey four loans totalling some U.S.\$12,200,000, of which about two-thirds will go to the Turkish mining industry. The loan is repayable in four years from 1962.

The Italian State holding company, Finsider, which produces, through its subsidiaries, some 44 per cent of Italy's raw steel, and 66 per cent of her pig iron, as well as ores and lignite, has announced its 1959 production figures. Output of iron and manganese ores fell by 6.3 per cent to 930,000 tonnes (990,000 tonnes in 1958); brown coal by 14.3 per cent to 130,000 tonnes (160,000). Pig iron rose by 1.9 per cent to 1,770,000 tonnes (1,730,000) and raw steel by 2.9 per cent to 3,570,000 tonnes (3,470,000).

Plants for the production of expanded perlite are now being exported by Hungary's EXEMI export bureau. The installations were developed in the country and are of the akinetic and horizontal type. Present capacity is 5 cu. m. of expanded perlite per hr., which may be increased.

The Government of Trinidad is reported to be inviting a geologist of the Overseas Geological Surveys to carry out a preliminary examination of the northern range in the island, and of Tobago, where the occurrence of economically important minerals has been reported. The objective is to establish whether minerals are present in sufficient quantity to warrant detailed examination by geophysical methods or core drilling.

Technicians of the Coal Research Institute at Ostrava and of the Vitkovice Iron and Steel Works, Czechoslovakia, have produced a giant, new drilling rig for obtaining cores in mineralogical prospecting. The tower is 198 ft. high. The main feature of the framework, carrying the drilling gear, is two tubular legs through which access is possible to the control platforms. With this rig it will be possible to use special bits, two or three times as long as those used so far; and it is claimed that the time required to complete one probe to a depth of 3,960 ft. will be cut by a half. The picture shows a general view of the rig.



It is reported that Yugoslavia, Europe's main silver producer, exported some 60 tonnes of electrolytic silver over the past year, and plans to expand future foreign sales to Federal Germany alone equal to about 40 tonnes in 1960. Total annual production at present varies between 80 and 120 tonnes, depending on the silver content of ores mined. Main producers are the Trepca - Zvečan lead-zinc mine and the Bor copper mine.

It is reported from Casablanca that plans to build up an iron works in the Nador district of the Kingdom of Morocco have been postponed. Foreign firms, including Krupps and Republic Steel Corporation of the U.S., have shown little interest in immediate action, and the Moroccan Government is not expected to make a decision until the Algerian situation is a less important factor.

Soviet prospectors are reported to have found substantial deposits of iron ore at Rajou in the Aleppo Mohafazat district of Syria. Other mineral deposits were also found but have yet to be proved of commercial value.

Official figures published recently in the South Korean newspaper *Chosun Ilbo* reveal a considerable drop in metal ore output during 1959. Lead and zinc ores fell by approximately one-fifth and one-third respectively, compared with 1958, while tungsten fell by 96 per cent, silver by 94 and copper by 46 per cent. These falls are due mainly to the closing of several mines, on account of financial difficulties, attributed in the case of the tungsten mines to the removal by the Americans of ore at prices far below both the cost of production and world prices obtaining during 1959. The Ministry of Commerce and Industry reports the value of South Korea's 1959 mineral exports as totalling U.S.\$9,905,000 including tungsten worth \$3,690,000 and iron ore \$2,665,000.

Brunswick Mining and Smelting Corporation and Sogémines, have agreed in principle to place Brunswick's zinc, lead and copper mine at Bathurst into production, at a cost of \$17,500,000. The agreement is for an initial production rate of 2,000 tons of ore a day, with a 15-year contract to sell mine concentrates to Belgian smelters, but after five years Brunswick Mining may build its own smelter. Brunswick Mining is owned 40 per cent by St. Joseph, and 3.5 per cent by Sogémines. The latter company is contributing about \$7,500,000 towards bringing the mine into operation, and is also arranging to raise a portion of the balance necessary. The agreement has aroused considerable opposition in the New Brunswick Provincial Legislature.

It is announced from Brussels that full-scale production of silicon is soon to be started by the Société Générale Métallurgique de Hoboken, which has been producing the mineral on an experimental scale for some time.

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Highveld Power Station, some 15 miles south of Vereeniging, built to supply power for the O.F.S. mines, 100 miles away, is already transmitting 160 mW. at 275,000 v. to one of the four goldfields distribution stations. Highveld has been designed to take eight 60 mW. machines, of which six are on order or installed. It will eventually be one of the largest stations in the Union, burning more than 6,000 tons of coal daily.

The results of a survey of Uruguayan manganese and iron ore deposits, carried out by German geologists confirmed the existence of the ferromanganese and iron ore deposits discovered by British geologists in 1936, which were not then considered sufficiently large to warrant exploitation. Recent surveys, however, report some 100,000,000 tonnes of low concentrate iron ore in the Cerro Mulero (Valentines) area, some 250 ks. north-east of Montevideo, and a Uruguayan company, "Yacimientos Minerales de Valentines" has been formed to work these deposits. The installation of a plant of 330,000 tons annual capacity is being considered, which would satisfy Uruguay's domestic steel requirements.

It is reported from Finland that the Kolari iron ore area on the Swedish border has been bought by Otanmaki Oy., and the railway is to be extended to Kolari from Kaurilanta. Suomen Malmi is to continue prospecting in the area of Muonio.

Mysore Government is understood to be considering a Rs. 100,000,000 scheme, aimed at increasing manganese and iron ore output from 300,000 tons to 1,000,000 annually. It is further reported that the state-owned Kolar gold mining concern and the Bhadravati Iron and Steel Works in Mysore will be constituted into a corporation with a capital of Rs. 20,000,000 and Rs. 200,000,000 respectively, according to Mr. Jatti, Chief Minister of Mysore.

A new Research Institute is being established at Stanlinsk, U.S.S.R., in connection with the opening up of new ore mines in Gornaya, Shoriya, Krasnoyarsk Territory, to study methods of improving techniques by increasing mechanization and automation. It is also announced from Russia that a new geological map of the European areas of the U.S.S.R., Poland, Czechoslovakia, Rumania, Albania and some adjacent countries will shortly be published.

The mining industry of Laos is being rapidly expanded, though short of capital in some directions. Important new tin deposits are reported to have been found near the present workings at Savannakhet, and are reputed to be enough to increase present Laotian tin output tenfold. In 1958 production totalled 558 tonnes. Anthracite deposits of considerable size were recently discovered to the north of Savavane. A French oil company has purchased boring rights in the Vientiane and Savannakhet areas. Other mineral deposits of potential importance include those of lead, copper and gold in the Tchepone-Savavane-Vientiane areas.

Shortage of spare parts is reported to be threatening a further drop in the output of tin from mines on Bangka Island, Indonesia. Estimates for 1960 output are 140,000 tonnes compared with 150,000 in 1959. Smuggling also is causing serious loss. Mineral surveying is planned on an increased scale, and is envisaged on Borneo and Flores for iron ore, on Halmahera for asbestos, and at Tjirotan near Bandung, for copper, lead and zinc. Some of the surveys are conducted with foreign aid, but domestic funds are available for private enterprise.

Soviet engineers are to visit India to plan the development of the new coal field in Korba, which is to supply fuel for railways and the new power station for the Bhilai iron and steel works. The U.S.S.R. is to help in the construction and supply necessary machinery. Of the annual output of 4,000,000 tons envisaged under this plan, half are to be extracted at the Manikpur mine — a stripmine with two pits, a coal-washing plant and workshops for mechanical and electrical repairs—with reserves for stripmining estimated to last at least 50 years. The high-ash Manikpur coal will be beneficiated at a plant which, although it has a rated capacity of 2,000,000 tons, will require only a dozen men to operate it. Plans are being prepared for the opening up of a further two mines in the same area, with an aggregate annual production of 1,500,000 tons, and in one where the coal will be mined hydraulically.

A recent announcement by the Colombian atomic authority, Instituto de Asuntos Nucleares, recently stated that Colombia has some 600 tonnes of uranium ore ready for shipping but could find no market. Negotiations were reported to be under way with British and Japanese interests for exchanging the ore for mining machinery or other goods. The ore, mined by the Minuranium firm in the California district of the Colombian department, Norte de Santander, is at present lying on dumps on the exploitation site.

Sir Thomas Playford, Premier of Adelaide, announced recently that an enormous slag dump at Port Pirie was to be treated for recovery of its zinc content by Broken Hill Associated Smelters, who were installing a new type of blast furnace which, with ancillary plant, would cost £A2,500,000.

A planning and project company for mineral exploitation schemes, backed by a banking consortium and German industrial interests, has been formed in Essen, West Germany, under the name of Bergbau-Planungsgesellschaft m.b.H. This concern, which will work to a large extent in the planning of mining schemes for under-developed countries, will take over and reorganize the Geological and Mining Engineering Research Centre, which previously operated under the auspices of the Veruschacht G.m.b.H. Planungsgesellschaft's first job will be to carry out a study of the Sicilian sulphur industry, under a contract originally given by the Italian Government to Veruschacht.

INTERNATIONAL WROUGHT NON-FERROUS METALS COUNCIL TO VISIT CENTRAL AFRICAN FEDERATION

Delegates from more than a dozen countries will meet in Salisbury next month when the International Wrought Non-Ferrous Metals Council holds a conference in the Federal capital on March 14 and 15. The delegates will also visit Kariba and the Copperbelt later in the same week.

The International Council represents copper and copper alloy fabricating industries of 13 Western European countries, or nearly 200 individual companies. Of its 13 member countries, at least 10 will be represented at the Salisbury meetings. They are Great Britain, Germany, Belgium, Denmark, Finland, France, Italy, Norway, Sweden and Switzerland. Twice a year the International Council holds meetings with representatives of the copper producing industry and on the occasion of the Salisbury meetings there will be present producers' representatives from the Belgian Congo, Germany, Rhodesia, South Africa and possibly Chile.

The International Wrought Non-Ferrous Metals Council, which was founded in 1953, is an example of the growing co-operation between Western European countries which has taken place since the war. The companies which it represents convert refined copper, produced in Africa and other parts of the world, into the shapes needed for a wide range of uses, either as pure copper, or its alloys such as brass, bronze, cupro-nickel and nickel-silver.

The chief functions of the International Council are to provide a forum where members can discuss and help each other solve their common problems, to serve as the industry's representative body and to develop as far as possible the uses of copper and its products. In its committees it deals with technical problems, such as mechanical handling, and its other activities include productivity surveys to assess the efficiency of different manufacturing methods, studies of industrial accident rates and means of improved safety.

The International Council has also carried out a comprehensive survey of the substitution of other materials for copper, and the effect of the copper price on consumption.

In addition, the International Council provides copper producers with statistical information on the level of trade and on orders being placed. It is hoped that this information, together with estimates of future demands, will assist producers in keeping the supply of copper in step with demands and thereby avoiding the sharp fluctuations in price which have disturbed the market in recent years.

Meetings of the International Council have hitherto been held only in Europe. The visit to the Federation has resulted from a suggestion made by Sir Ronald Prain, Chairman of the Rhodesian Selection Trust Group of Companies, at a meeting of the International Council in Paris last November, and arrangements locally are being made by the R.S.T. Group and the Anglo American Corporation Group of Companies.

The 1960 annual conference of the Institution of Plant Engineers will be held at Scarborough from May 4-6.

Machinery and Equipment

A Belt Weighing Machine

The Merrick Scale Mfg. Co. Ltd., announce their new SV weightometer belt weighing machine. The unit will fit to horizontal or inclined conveyors having either flat or troughed idlers, and will totalize the weight of material passed over the conveyor.

The heart of the weightometer is a mechanical integrator which continuously multiplies two varying quantities which are first, the ever varying load on the conveyor, which often is subject to extreme and very rapid fluctuations and second, a slightly varying belt speed of the conveyor. The speed of any conveyor, whilst usually considered as constant, in reality varies slightly with the load, and in weighing, unless these conditions are taken into consideration, any final results will be erroneous. The weightometer can be supplied to suit any conveyor capacity and belt speed.

All types of instrumentation can be supplied with the machine, both electronic and pneumatic. The weight recorder, which shows the weight of material passed over the conveyor, can be at a remote position if required. Advantages of this machine lie in the ability of the unit to be fitted to existing conveyors with a minimum of modification to the structure, together with simplicity of design and low headroom requirements.

The accuracy of the SV weightometer is plus or minus $\frac{1}{2}$ per cent of true weight passed when the conveyor is operating at full load conditions. The unit is thought to be the most competitive of this type manufactured in Europe and deliveries can be made within 14 weeks. The company is associated with the Merrick Scale Mfg. Co. of Passaic, New Jersey, U.S.A.

BAG FILTERS

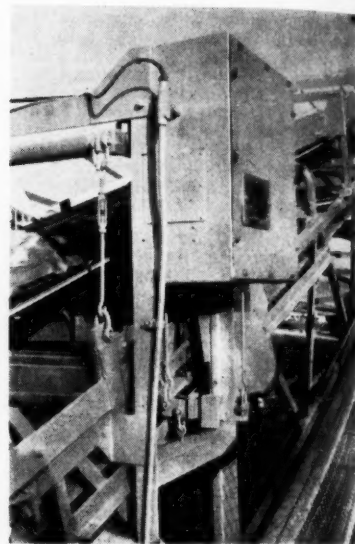
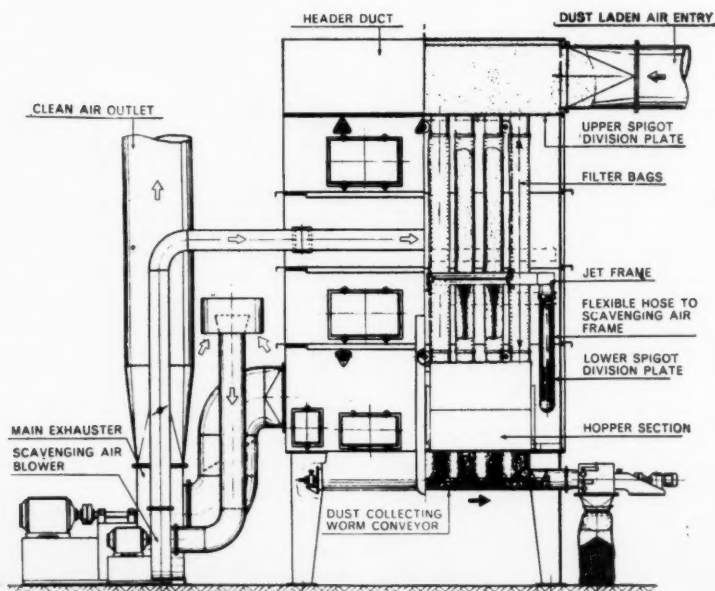
A further addition to the range of dust collection and control plant manufactured and marketed by the Gas Cleaning Division of W. C. Holmes and Co. Ltd., is the Holmes-Retroflux bag filter. This filter was developed by Standard Filterbau Gesellschaft m.b.H. of Munster and is to be manufactured under licence in the United Kingdom.

The Holmes-Retroflux bag filter is particularly suitable for those applications where high dust burdens are encountered and/or dusts of an adhesive nature have to be collected. It is of advanced design and is claimed to have an efficient and continuous method of cleaning the filter bags which ensures that large volumes can be handled with constant pressure drop and high collection efficiency.

In operation, the dust laden air enters the header within the casing and is distributed to the inside of the filter bags, the air and dust moving in the same direction. The tendency of the dust to settle by gravity is not impeded by air currents as the air passed through the filter bags

Above, the belt weighing machine by Merrick Scale. Below, general arrangement of a Holmes-Retroflux bag filter

radially and the air velocity gradually diminishes to zero at their lowest end. The dust collected on the inner surface of the filter bags is continuously dislodged by the passage of high velocity air jets through the fabric in the reverse direction to the main air stream. The dislodged dust falls by gravity to the worm conveyor or hopper below. The



use of high velocity air jets is a design feature of the Holmes-Retroflux bag filter which dispenses with the rapping or shaking mechanism and separate compartments encountered in other types of bag filters.

THE THORITE MOTORIZED DRUM

The Thorite motorized drum is an advanced contribution to the science and technology of materials handling. It satisfies basic conveyor and elevator requirements and can offer many advantages when incorporated in equipment which needs electric motive power and reduction gearing.

The drum is claimed as a compact, safe, single unit which can be easily and rapidly installed. It is necessary only to fit the revolving shaft into a self-aligning plunger block, the stationary shaft into a fixed retaining bracket, and to connect a 3-phase supply to a junction box. Since all electrical and mechanical parts work in optimum conditions, sealed within the drum shell, many common causes of breakdown are eliminated. There is only one point between the fixed shaft and the rotating drum through which oil could escape or foreign matter enter the interior, and this avenue is sealed with an oil seal tested to satisfy the most exacting requirements. The electric motors are specially designed 3-phase stator-rotor of continuous maximum rating, and range from fractional to 20 h.p.

ALTERNATIVE ENGINE FOR VICKERS VIGOR TRACTOR

Vickers-Armstrong (Tractors) Ltd., announces that the Vickers Vigor tractor is now available powered by a 210 engine h.p. Cummins NT-6-B1 diesel engine.

The Turbocharged NT-6-B1 is one of the Cummins range from 130-335 b.h.p. Its basic parts are interchangeable with those of all other British and American-built Cummins engines in the same h.p. range designed specifically for construction equipment.

The Vickers Vigor powered by a Rolls-Royce diesel engine of 210 h.p. is already in operation together with Vickers Onions earth-moving equipment in all six continents.

Metals and Minerals

Aluminium and the Common Market

Representatives of the six European Common Market countries held a meeting in Rome this week to discuss the last problems involved in erecting a joint external tariff for imports into their area. The aim of the meeting was to reach an agreement on tariffs on "G" List goods, comprising those items which individual member governments wish to protect by higher customs duties than those of the other partners. The list has been reduced through negotiations from eighty to eight headings, four of which are aluminium, magnesium, lead and zinc.

The most controversial item on "G" List is aluminium, for which France, with her ambitious plans for large-scale aluminium production, based on cheap natural gas, would like a high Common Market tariff to be imposed. It was thought that a tariff of between 11 and 12 per cent would finally be agreed on, which could later be reduced through the General Agreement on Tariffs and Trade (GATT). A tariff of this order, however, would constitute a severe setback to Belgian plans to help the future independent Belgian Congo to produce aluminium competitively with power from the Inga hydroelectric scheme. It would also, of course, be detrimental to producers outside the Common Market. For lead and zinc a compromise is expected between demands ranging from 4 per cent and 7 c. per lb.

Mr. Nathaniel V. Davis, president of Aluminium Ltd., who is at present visiting Europe largely for the purpose of campaigning against a high Common Market external tariff on aluminium, has been quoted as stating that he regarded the Common Market countries' plans in this connection as "very harmful" for Alcan. Addressing a luncheon of the Franco-Canadian Chamber of Commerce, in Paris, Mr. Davis advocated freeing world trade in aluminium from restrictions, particularly by removing tariff protection. Aluminium production required cheap power supplies, he pointed out, while Europe was no longer in a position to produce more electricity for economic aluminium production. Therefore, the Western countries would have to rely on foreign supplies.

"We are on the threshold of a new era for aluminium marketing," said Mr. Davis. "At present about 20 per cent of the aluminium produced in the Western World is being exported. The balance is consumed on the spot." In future, more and more aluminium would be produced in under-developed countries to be shipped to industrial countries, he continued. This would undoubtedly prompt a considerable increase in world trade in this metal, which would inevitably require the dismantling of many of the measures used by various countries to protect their domestic aluminium industries. The establishment of a single common external tariff on aluminium by European Common market countries, it was added, was an excellent opportunity to start the move towards freeing the world aluminium trade.

Mr. Davis expressed optimism about future consumption trends. He pre-

dicted that the most spectacular expansion would take place in the European Common Market countries, where consumption of the metal would double in the next decade. Demand in other West European countries was unlikely to grow at quite so rapid a pace, due to the disparity in economic conditions between these countries and the Common Market. An increase in world demand could easily be met, because North American aluminium companies were currently working at only 85 to 90 per cent of capacity.

Previously, Mr. David had described the West German import duty of 7 per cent on aluminium, plus the 4 per cent turnover tax, as being too high. He welcomed reported suggestions to the West German Economics Ministry that the duties should be reduced to 4 or 5 per cent, even though these suggestions envisaged the simultaneous abolition of the duty-free quota of 65,000 t.p.a.

Alcan has two German subsidiaries, in Nuremberg and Goettingen, and it has recently opened a technical advice office in Frankfurt to make Canadian experience available to German manufacturers.

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Agreement has been reached on the formation of an international con-

sortium to develop the Boké project in Guinea for the production of 220,000 tons of alumina annually, though it may be a matter of months before arrangements can be completed. Aluminium Ltd., with its French subsidiary Bauxites du Midi, first announced plans for the area three years ago. The project was shelved because of the international recession and of political developments in the area. However, Aluminium Ltd. recently started negotiations with other major producers to carry out the project, the latter comprising Alcoa, Reynolds, Olin Mathieson, Kaiser Aluminium, Vereinigte Aluminiumwerke (Germany), Pechiney and Ugine (France) and Aluminium A.G. (Switzerland).

Plans for the Boké project call for the mining of 1,500,000 tonnes of bauxite a year. The building of a 120-km. railway from Boké to the coast and construction of a port at the mouth of the Rio Nunez started some time ago.

Another basic alumina undertaking in Guinea will start production in a few weeks, namely the huge alumina project at Fria. The Fria Co., formed by Olin Mathieson, British Aluminium, Aluminium Industries A.G. of Switzerland, and Vereinigte Aluminiumwerke of Germany, with French interests, aims at an output of 450,000 tonnes of alumina annually.

LONDON METAL AND ORE PRICES, MARCH 3, 1960

METAL PRICES

Aluminium, 99.5%, £186 per ton	Manganese Metal (96%/98%) £275/£285
Antimony—	Magnesium, 2s. 2½d./2s. 3d. lb.
English (99%) delivered, 10 cwt. and over £190 per ton	Nickel, 99.5% (home trade) £600 per ton
Arsenic, £400 per ton	Osmium, £22/£24 oz. nom.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Osmiridium, nom.
Cadmium 10s. 0d. lb.	Palladium, imported, £9
Cerium (99%) net, £16 0s. lb. delivered U.K.	Platinum U.K. and Empire Refined £30 5s.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.	Imported £28/28½
Cobalt, 14s. lb.	Quicksilver, £70½/£71 ex-warehouse
Germanium, 99.99% Ge. kilo lots 2s. 5d. per gram	Rhodium, £45/£48 oz.
Gold, 250s. 3d.	Ruthenium, £16/£18 oz. nom.
Iridium, £23/£25 oz. nom.	Selenium, 50s. 0d. per lb.
Lanthanum (98%/99%) 15s. per gram.	Silver, 79½d. f. oz. spot and 79½d. f'd
	Tellurium, 21s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis	19s. 6d./21s. 6d. per unit, c.i.f.
Beryl (min. 10 per cent BeO)	230s. per l. ton unit BeO
Bismuth	65% 8s. 6d. lb. c.i.f.
	18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable 48%) (Ratio 3:1)	£15 15s. 0d. per ton c.i.f.
" Hard Lumpy 45% (Ratio 3:1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40%	£11 0s. 0d. per ton c.i.f.
" Smalls 44% (Ratio 3:1)	£14 0s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3:1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10:1)	Nb ₂ O ₅ : Ta ₂ O ₅ 175s. per l. ton unit c.i.f.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF ₂)	156s. 0d. ex. works
Lithium Ore—	
Petalite min. 3½% Li ₂ O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li ₂ O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li ₂ O	£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£23 0s. d/d
Manganese Ore Indian—	
Europe (46%-48%) basis 67s. 6d. freight	73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)	69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)	nom.
Molybdenite (85%) basis	8s. 11d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂ (prompt delivery)	£28 0s. 0d. per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO ₂	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	156s. 0d./161s. 0d. per unit c.i.f.
Vanadium—	
Fused oxide 95% V ₂ O ₅	8s./8s. 11d. per lb. V ₂ O ₅ c.i.f.
Zircon Sand (Australian) 65-66% ZrO ₂	£16/£16 10s. ton c.i.f.

Aluminium Ltd. has announced that its associate company, Indian Aluminium Co., proposes to carry out a substantial expansion of its bauxite, alumina, aluminium ingot, rolling mill and extrusion facilities, in India. This plan represents an integrated programme, from bauxite through ingot into sheet and extrusions, to cost approximately \$17,000,000. The largest segment of the plant is the addition of 11,200 tons of primary ingot capacity.

*

The Board of Trade has begun to sell its 37,000 ton aluminium stockpile to Alcan (U.K.). Alcan (U.K.) is the successor of Aluminium Union, the original supplier. Under the sale agreement, Alcan has already taken some 10,000 tons, and the remaining 27,000 tons are to be delivered before June, 1964. The price has not been disclosed, but reports indicate that it will be in line with the market level at the time of sale.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

The week has been marked by an absence of news which has caused any violent price fluctuations in any of the metals dealt in on the Exchange but during the period signs have accumulated that the firm copper market is probably at an end and that a period of gradually falling prices has now been reached.

U.S. COPPER PRICES EASING

The world price structure for copper so far shows little change but there are signs of a downward movement stemming from the fact that the smelters' intake price for scrap in the U.S. is now down to 25 c. per lb. which indicates electrolytic copper for delivery in 3 months' time at about 31 c. per lb. It is expected that the first move will be made by the U.S. customs smelter in a reduction of their present price of 35 c. per lb. down to 33 c. per lb which will bring it in line with the primary producers and also the price at which Belgian copper is available in New York, duty paid.

At the same time in the U.S., the so-called dealer copper is only moving with difficulty and at prices equal to the customs smelter price although small premiums are still obtainable for immediate delivery material as the availability of copper in the U.S. is still affected by the recent strikes. The Brass Mills indicate business as being disappointing and the figures issued by the Copper Association for January are not very encouraging. These show that U.S. domestic consumption of copper by brass and wire mills and foundries during January totalled 102,609 s.tons, as compared with 88,622 s.tons in December: new orders booked in terms of refined copper totalled 98,484 s.tons against 66,955 s.tons: unfulfilled orders on the books totalled 198,650 s.tons against 202,775 s.tons and stocks of refined copper in fabricators' hands

KOREAN TUNGSTEN EXPORTS

Agreement has been reached between the Government-owned Korea Tungsten Co. in Seoul and the International Ore Corporation in New York to increase the monthly volume of Korean tungsten shipments to the U.S. to 500 tonnes from the current 300 tonnes. International Ore Corporation is the exclusive sales agent in the U.S. for the Korea Tungsten Co.'s products.

SOFTER QUICKSILVER MARKET

A further softening in the London exchange quicksilver price has been in evidence during the past week. Quotations currently range from £70 10s. to £71 per flask, compared with £70 15s.-£71 5s. a week ago. A certain amount of Yugoslav and Chilean metal is reported to be offering on a market currently devoid of much buying interest.

remained pretty well unchanged at 416,187 s.tons against 414,757 s.tons.

In the U.K. and on the Continent of Europe consumer demand remains satisfactory and, on those days when the L.M.E. quotation has fallen, demand has shown an increase. Stocks in Metal Exchange warehouses showed an unexpectedly large decrease of 515 tons to a total of 3,607 tons. This indicates the possibility that during the next few weeks the cash price of copper on the L.M.E. is likely to be somewhat volatile and, in fact, there was an example of this at the end of last week when a small amount of consumer demand was reflected in a price jump of about £5 per ton on an afternoon market.

It is reported from Chile that President Eisenhower during his visit stated to the Chilean President that there was no intention of making releases from the U.S. stockpile and also that in view of the latter's remark that the present U.S. import duty was damaging and prejudicial to Chile he would study the possibilities of its removal. It is pointed out in London that the U.S. President did not specifically include the various stockpiles which are in existence and could quite easily have been referring only to the National stockpile, while with regard to the possibilities of any removal of the duty, this is very unlikely in view of the fact that copper prices are probably entering into a period of a downward trend.

NEXT I.T.C. MEETING EXPECTED TO BE UNEVENTFUL

The tin market has once again been featureless and it is not expected that the meeting of the International Tin Council, scheduled for March 8 is likely to produce any surprises, and in spite of estimates of over-production during 1960, it is felt that the export quotas will remain unchanged.

In the U.K., stocks showed a slight fall of 72 tons to 8,160 tons, and from the East, figures for shipments during February show an appreciable increase, shipments from Penang totalling 5,599 tons (against 4,924 tons in January) and of this total 3,370 tons were shipped to the U.S.A. The Singapore shipments were again infinitesimal at 1½ tons. On Thursday the Eastern price was equivalent to £796½ per ton c.i.f. Europe.

DETAILS OF BOARD OF TRADE ZINC DISPOSALS

The lead and zinc markets have remained steady. The tendency for a backwardation to grow in the lead market has increased and it is considered that this is due to shortage of metal for prompt delivery in the United Kingdom although reports from the Continent of Europe indicate that there is no ample supply there yet. In the U.S., demand for lead remained quiet but a number of consumers are buying for forward delivery at today's fixed price of 12 c. per lb. which can indicate that a rise is expected over the next three months. Zinc demand remains good throughout the world although there has been a little slackening off in the motor industries due to the season in Europe and the building up of unsold cars in the United States.

On Tuesday the Board of Trade announced details of the disposal of their stocks of 53,000 tons of zinc and as this was very much in line with what had been indicated previously it had little effect on the market. The details are that the stock consists of: 35,000 tons of high-grade zinc, 12,750 tons special high-grade zinc, 5,250 tons of G.O.B.

Of these tonnages, 2,250 tons of special high-grade and 3,050 tons of G.O.B. are being sold back to the agents of the original producers over the next four months: 32,000 tons of high-grade and 4,000 tons of special high-grade will be sold back to the agents over a period which may extend to four years but which will depend upon the state of the market during the period of disposal: of the balance of the G.O.B., namely, 2,200 tons, 200 tons of high-grade and 700 tons of special high-grade will be sold by tender for delivery April/September of this year: the disposal of the small balance will take place subsequently.

Closing prices are as follows:

	Feb. 25		March 3	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash ..	£253½	£254	£295½	£260
Three months ..	£241½	£242	£241	£241½
Settlement ..		£254		£260
Week's turnover	14,425 tons		11,200 tons	
LEAD				
Current ½ month	£74½	£74½	£75½	£75½
Three months ..	£73½	£74	£74½	£74½
Week's turnover	8,425 tons		8,325 tons	
TIN				
Cash ..	£789	£790	£784	£785
Three months ..	£788	£788½	£784	£784½
Settlement ..		£790		£785
Week's turnover	510 tons		755 tons	
ZINC				
Current ½ month	£87½	£87½	£87½	£88
Three months ..	£87½	£87½	£87½	£87½
Week's turnover	6,425 tons		2,475 tons	

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Mining Finance

Expansion Ahead for C.M.S. ?

One of the difficulties faced by South African companies wishing to invest outside the Union is the stringency of the Union's exchange control arrangements. An instance of this occurred when De Beers wished to acquire Williamson Diamonds after the death of Dr. J. T. Williamson. The requisite foreign exchange was made available by the S.A. authorities, but only on the understanding that an effort would be made to raise a similar amount abroad. In the event an expedient solution was found in the loan arrangements which Anglo American was at that time concluding with the Deutsche Bank.

It now appears that a possible long-term solution to this problem has been found by the Anglo American group. Consolidated Mines Selection, one of the important finance companies of the group, is London-based, and is therefore free to invest virtually where it pleases. It may well be, therefore, that C.M.S. will in future be a major channel for Anglo American expansion outside the Union. During the past year, C.M.S. has taken an interest in McIntyre Porcupine and Locana Minerals. Both of these organizations are expansion-minded, and Mr. A. C. Wilson, the C.M.S. chairman, says in his advance statement that he hopes these investments will in due course "provide us with opportunities to participate in new mining ventures in Canada".

All this points to a considerable new expansionary impetus in Consolidated Mines Selection itself. Apart from the fields of investment which the company is now entering for the first time, C.M.S. is an active participant in Anglo American's prospecting programme. At the same time, the company's holdings in young gold producers (and their associated investment companies) ensures that the company's income will continue to grow during the foreseeable future.

Last year, taxed profits rose by about £33,000 to a shade under £300,000 making possible an effective increase of 10 per cent in the distribution. Subject to the usual qualifications, Mr. Wilson believes that it will be possible to repeat the performance of the last six years in 1960 by maintaining the present rate of dividend on the capital as increased by the proposed one-for-ten scrip issue.

Statement p. 280.

NEW CANADIAN INVESTMENT COMPANY

Locana Mineral Holdings has been registered in Canada as a means by which British, South African and European capital will be enabled to take advantage of mining opportunities in the Dominion.

A total of 1,200,000 n.p.v. shares is to be issued in the first instance. Of these, 300,000 are to be offered to the Canadian public. The balance of 900,000 will be taken up by Consolidated Mines Selection, Cecil Holdings (a "Chartered" subsidiary), Locana Corporation, Malayan Tin Dredging, Tronoh Mines, Banque de l'Indochine, Cables Investment Trust, Cie. Financiere de Suez, Foreign and Colonial Investment Trust, Hambros Bank, McIntyre Porcupine Mines, Ventures, and the British Empire Investment Trust. The stock is

approved for listing on the Toronto Stock Exchange.

The company will invest its funds mainly in the shares of mining companies operating in Canada. Its structure and associations will, of course, ensure that additional capital and technical assistance will be available whenever required.

FUNDING BY ST. JOHN D'EL REY

The latest report from St. John d'el Rey says that the gold operations are continuing to make a loss, in spite of the aid given by the Brazilian government to the gold mining industry. The existing formula for this aid has been extended until June 30 next, and the findings of a commission set up to examine the industry are expected in the very near future.

D'el Rey's biggest problem recently has been the rapidly climbing level of costs at the mines. The company is doing its utmost to offset this by organizational and technical changes, but the net result has been that no benefit has been felt from the improvement in the price received for d'el Rey's gold output as a result of a depreciation in the dollar-cruzeiro exchange rate. There will, therefore, be a substantial loss on the company's operations in 1959.

St. John d'el Rey's more distant future is, of course, dependent on the progress of work on the Agua Claras iron ore body, which is being investigated by a subsidiary company of the Hanna Mining Company. This ore body is believed to contain some 300,000,000 tons of ore, but its exploitation is dependent on transportation considerations, quite apart from the question of finding markets for the metal. Work during the year has concentrated on the transport problem, and the studies have indicated that shipping the ore overseas should be profitable, subject to satisfactory agreements with the Brazilian Government and the Central Railway, and provided that suitable financing can be arranged. Total expenditure to date on this development work has totalled £780,000, and it is anticipated that a further £250,000 will be spent during the current year.

All this is background to the fund-raising operation about to be undertaken by St. John d'el Rey. Recent financing has taken the form of unsecured loans from the Leo Model/Hanna interests, and it is proposed that this indebtedness shall be satisfied by an issue of shares by way of rights at 75s. per share. Altogether, the Hanna/Model interests will be entitled to some 89,200 shares, while outside shareholders, whose rights will be in the proportion of one-for-

LONDON MARKET HIGHLIGHTS

The first half of the week was a rather indeterminate time for South African Gold shares. The previous week had closed on a rather steadier note thanks largely to Johannesburg talk of helpful news for the mines in the coming South African Budget. But Monday saw a further drift in prices which lowered both Free State Geduld and Western Holdings by 3s. 9d. to 163s. 9d.

The drift continued for most of Tuesday but a steadier tendency developed towards the close of that day and the market seemed to be trying to go better on Wednesday. It was helped in this by some good profit results in the February monthly returns. The outstanding result was that of West Driefontein which made mining history by being the first gold producer to earn more than £1,000,000 in a month.

West Driefontein were little affected in price at 186s. 3d. because the news of their achievement had been anticipated some days beforehand. But Western Reefs improved to 29s. 9d. on a record surplus. There was little change of note in other Golds. The South African Budget proposals turning out to be of small interest as far as the mines were concerned, though the abolition of undistributed profits tax removes a cloud which was beginning to appear on the horizon of several investment companies as a result of the growth of S.A. holdings in S.A. companies.

Platinum shares strengthened as Johannesburg buyers found that the Continent was becoming less eager to sell stock. It was generally reckoned that the forecast resumption of interim dividends by Rustenburg would lead to interim payments this month from Union, Waterval and Potgietersrust as

well as from the producing company.

Coppers had another bad time for most of the week. Wall Street was exerting a rather depressing influence and to make matters worse there was also a persistent stream of selling from the Continent. This selling pressure eased up at last on Wednesday and investment buyers who had been waiting for such a development quickly moved in, raising Nchanga, for instance, from 60s. to 61s. 9d. in little more than an hour.

Whether the long awaited recovery in Coppers has begun depends largely on whether the Continental selling starts again. A further severe break on Wall Street would also be felt in the Rhodesian market. But it has not been overlooked that the recent fall in share prices may have been too sharp. Rhokana, for example, have come back nearly £1 a share in only a few weeks with the result that they now yield 6.5 per cent at 61s. 9d. An increased interim dividend is confidently expected with that of Rhodesian Anglo American on Thursday. About the only Copper share to resist the downward trend was Rhodesia-Katanga which rose to 14s. 9d. following a speculative demand from Rhodesia.

Tin shares remained quite steady. The market was given some fresh encouragement by the report of British Tin which told of an 80 per cent increase in the market value of the company's quoted investments. Lead-zincs did little more than jog along steadily but a feature elsewhere was the rise of 20s. to 107s. 6d. in St. John d'el Rey, the Brazilian gold and iron ore company. This advance reflected the impact on a very restricted market of the latest proposals for the mine's future.

ten, will be offered 30,456 shares at a quite generous discount below the present market price.

Since this operation will necessitate a general meeting, the opportunity is being taken to obtain shareholders' consent to a transfer of management to the U.S., and to the acquisition of Brazilian nationality by the company.

TIN INVESTMENT COMPANIES

There are surprisingly few investment companies with tin interests predominating. The extremely sound and steady condition of the tin share market in recent months, therefore, lends considerable interest to the publication of the report and accounts of two such companies, British Tin Investment and General Tin Investment.

Bearing in mind that dividends from tin companies tend to be declared some considerable time after the period to which they refer. Consequently, the 1959 dividends generally reflected much lower price and production levels than were in fact in existence, British Tin and General Tin can be said to have enjoyed successful years. British Tin's net attributable revenue rose from £245,430 to £286,940, while General Tin's improved from £199,040 to £208,760. British Tin increased its payment from 12 per cent to 22 per cent, while General Tin maintained the 1958 dividend rate of 12 per cent.

One important thing about these companies from an investment point of view is that although the predominating interest in each case is in tin, both companies have extremely sound portfolios of investments in other fields. That of British Tin covers the field of metals, minerals and metallurgy, making it an admirable investment for those who wish to have a stake in the commodity recovery generally. General Tin's investment list, on the other hand, is spread more widely through industry, commerce and finance. There is a great deal of growth built into this investment—indeed, it was switching into lower-yielding shares that prevented income from rising more last year—and this company provides an interesting alternative to the more orthodox investment trusts.

Mr. S. H. Smith, the chairman of both companies, makes a point in his review each year of discussing the outlook for the commodities in which the companies are interested. His statement to British Tin shareholders is on p. 282.

RAND AND O.F.S. RETURNS FOR FEBRUARY

In spite of a lower gold price, the elusive £1,000,000 profit in one month was achieved in February by West Driefontein. This was the first time that this figure has been exceeded by any gold mine in the world. Recovery at West Drie was 18.4 dwt., costs fell by 2s. to 69s. 1d., and including uranium profit, the overall earnings totalled £1,003,672, compared with £962,856 in January. This augurs well for an increase in next June's dividend—last December 4s. 9d. was paid.

President Brand, on the other hand, slipped back slightly in the race to become the second mine to achieve the magic million. Tonnage throughput was well maintained, but a drop in grade and the lower gold price were more than sufficient to offset a small improvement in costs. The other contender, Western Holdings, achieved a new record with earnings of £829,540.

Other new peak levels were achieved by Western Reefs and St. Helena. Higher recovery was the key in each case.

Among the more disappointing results was a decline in profit at Doornfontein by about £7,000, and an even sharper fall in earnings at Blyvoor from £798,612 to £775,041, this in spite of a slight reduction in the costs level. Free State Geduld, too, was unable to repeat the previous month's performance, and profits fell by almost £10,000 to £658,376.

S. A. URANIUM CONTRACTS—NO CHANGE YET

Recent discussions between the South African Atomic Energy Board and the Combined Development Agency had resulted in no decisions with regard to the contract arrangements with S.A. uranium producers, said Dr. T. E. W. Schumann, deputy chairman of the board, in Pretoria last week. The discussions were part of the routing of periodic consultations held in connection with the sale of uranium oxide to the Agency.

With the emergence of a substantial over-supply situation for uranium, it seems highly probable that a stretch-out or similar scheme will soon have to be worked out for the S.A. producers. Dr. Schumann's remark that "discussions might be resumed" may mean that the negotiations preceding such a scheme are already in train. Such negotiations, of course, would have to include the industry as well.

ANOTHER MAWCHI DISAPPOINTMENT

News has reached Mawchi Holdings from Rangoon that Mawchi Mines (1957), the operating company, has been placed in liquidation by the Burmese Government as holders of 50 per cent of the capital. Attempts at negotiations with the Burmese authorities had previously reached stalemate. It is not yet known what the result of the liquidation will be so far as Mawchi Holdings is concerned.

Meanwhile, Mawchi's diversification plans have reached the stage of active negotiations for a particular business, and it is intended that this will be the forerunner of others. Shareholders will be given an opportunity of approving these plans in principle at an extraordinary meeting which is to be called in due course to consider a capital reconstruction. No details of the proposed reconstruction are yet available.

ROBINSON DEEP GIVES NOTICE

Another of the old Rand mines has given the statutory three months notice of the possible discontinuance of mining operations. Robinson Deep, the mine in question, has been in continuous operation for more than sixty years, and mining operations are in progress more than 9,000 feet below surface, making it one of the deepest producers on the Rand.

Indeed, it is the great depth of the present workings which has largely contributed to the present decision. Severe pressure

bursts in the Turf section of the mine led to operations there being suspended, leaving the Chris section to carry virtually the whole weight of the mine's future. Long-wall stoping was instituted in this latter section, but as a result of a falling-off of values in some of the stopes, a loss of £112,213 was incurred last year.

Like that of Modder E., Robinson Deep's notice is not to be taken to mean that operations will necessarily cease in three months' time. A reorganization programme is under way in an attempt to reduce costs, and in any event there is a possibility that results at depth will recover. The notice is merely intended to cover the possibility of a shut-down, which, at this stage of a mine's life, could be enforced by any severe mechanical or geological mishap.

BOARD CHANGES

Mr. G. Abdinor has been appointed a director of Tweefontein United Collieries.

Mr. M. E. Rich has resigned his seat on the board of directors of General Exploration Orange Free State. Mr. S. L. Segal has been appointed a director to fill the vacancy so created.

Mr. H. T. Skipp, Mr. E. A. P. L. Scrivener and Mr. H. A. Crowe have resigned from the board of Naraguta Extended Areas, and Mr. W. H. Harrison-Cripps, Mr. P. A. Revell-Smith and Mr. S. J. Harland have been co-opted as directors. The registered offices have been removed to 66 Gresham Street, E.C.2.

Mr. L. D. Browne has been appointed a director of Marievale Consolidated Mines to fill the vacancy caused by the resignation of Mr. P. S. Hammond.

Mr. W. J. Hefer has been appointed a director of Brakpan Mines.

DAVIES INVESTMENTS LTD., Bankers, still offer 7½ per cent on sums £20 to £500 (withdrawal on demand) with extra ½ per cent on each £500 unit. Details and audited Balance Sheet from Investment Dept. MN, Davies Investments Ltd., Danes Inn House, Strand, London, W.C.2.

ASSAYERS required for a Mining Group operating in Ghana. Contracts of 15 months with 3 months' leave on full pay. Free passage out and home. Accommodation and medical attention provided. Pension scheme in operation. Salary according to experience. All applications treated in the strictest confidence. Apply by letter giving full particulars of age and experience to Box 88, Walter Skinner, Ltd., 20 Copthall Avenue, London, E.C.2.

COLONIAL DEVELOPMENT CORPORATION

Macalder-Nyanza Mines Ltd.

GRADUATE MINING GEOLOGIST

with at least three years' experience in grade control, underground structural mapping, underground surveying and core logging, required for Kenya copper mine. Inclusive salary according to experience in range £1400 - £1700. Outfit allowance; paid leave after tour of 24 to 30 months; pension scheme.

Apply in writing to Personnel Officer
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giving full particulars and quoting Serial 399

SAN FRANCISCO MINES OF MEXICO

DIFFICULT TRADING CONDITIONS

FULL-SCALE PRODUCTION MAINTAINED

MR. A. V. CONRAD ON FACTORS AFFECTING SALES

The 47th annual general meeting of San Francisco Mines of Mexico, Limited will be held on March 15 at Winchester House, Old Broad Street, London, E.C.2.

The following is the statement by the Chairman, Mr. A. V. Conrad, which has been circulated with the report and accounts:—

The year ended September 30, 1959, was another difficult year for the Company. It is true our accounts show a modest profit of £134,000 compared with a loss in the previous year of £208,000. The profit for the year has, however, resulted from bringing in our end-year stocks at higher unit values—last year our lead and zinc stocks were valued at below cost and this year at cost—and these stocks have yet to be realized. In general, although our sales have increased they have fallen short of our production. In particular, sales of lead, normally our principal revenue-earning product, have been difficult to effect and short of forcing sales on a sensitive and unresponsive market during a period of low prices we have found it necessary to increase our stocks of lead and to tie up considerable cash resources in so doing. Consequently, despite making a profit, available cash resources at the end of the year showed a further reduction and this process, accentuated by the interruption to our sales of copper following the labour strike at the U.S. refinery which treats the metal emanating from our concentrates, has continued in the current year to date. In the circumstances your Directors regretfully came to the conclusion that it would not be in the Company's interest to declare a dividend out of the modest profit earned.

In this connection it is pertinent to bear in mind the conclusions of the International Lead and Zinc Study Group which has just reported that in the case of lead a small surplus of production over consumption still exists. Moreover, there is agitation at the present time in the United States for an increase in that country's import duties on lead and zinc or a decrease in its import quotas. If either of these came to pass further harm would be done to non-U.S. producers, and particularly producers like ourselves who by virtue of their geographical position naturally look to the U.S.A. as their principal customer.

As mentioned in the Directors' Report, it has been the weak market for lead during the year which has effectively limited the Company's sales of that metal and not the U.S.A. quota system nor the limitations on exports of lead (and zinc) imposed by the Mexican Government to conform with the United Nations Lead and Zinc Committee's recommendations. In the case of zinc concentrates, however, the United States quota system was responsible for a restriction of our sales. I am glad to say that the improvement in the demand for zinc has recently enabled us to conclude a contract for the sale of the resultant stock of zinc concentrates accumulated, the benefits of which sale should be felt in the current year.

Operations

We have continued to run our plant at full capacity, notwithstanding our inability

to sell our entire production. In part, this policy was dictated by the difficulties involved in making any large scale reduction of the labour force but also because we believed that so long as cash resources permitted our own long term interest would be best served by maintaining the tempo of operations. Full-scale production has assisted in keeping down costs while on the other hand we may reasonably hope in the case of lead, as we are now experiencing in the case of zinc concentrates, to sell our accumulated stocks in due course at a higher price than would have been possible during the period when the metals were being accumulated. It behoves us, therefore, not to be unduly downcast by the results of individual years, but to consider our fortunes over a longer period.

Turning to the details of the operations themselves, there is no marked change on those of the previous year to report. The tonnage milled was slightly higher—a new record—and the grade milled was about the same. The metallurgical results were again marginally improved.

With some reduction in the labour force due to men leaving not being replaced, development work during the year was reduced somewhat. The results of this work, however, were satisfactory and are reflected in a useful increase in the tonnage and grade of the Ore Reserves.

Fluorspar

We have for some years been experimenting in the mine laboratory to see whether we could find a method of producing acid grade fluorspar from our tailings. The difficulty hitherto has been to reduce such elements as sulphur below the maximum limit acceptable to consumers. Recent laboratory results suggest we may now have found a method of so doing and on the recommendation of our metallurgical consultant, Mr. L. H. Lange of The Galigher Company, we have since the end

of the year under review decided to install a pilot plant to treat 100 metric tons a day of our tailings for the production of acid grade fluorspar and also the more easily produced metallurgical grade. The pilot plant is now in operation and preliminary results to date are encouraging. If this is as successful as we hope we may need to invest further cash in erecting a new mill to treat our tailings for the recovery of fluorspar in the hope that this additional operation will prove a further useful source of revenue in the future.

Taxation

Once again I have to refer to the oppressive burden of Mexican taxes, the rates and bases of which remained unaltered in the year under review. Because of the higher revenue, the charge for "gross" taxes rose by £306,000 to £1,724,000 and this load was made still heavier by our liability to Income Taxes on the profit earned. The final result was a total tax bill at the crushing level of 93 per cent. of earnings before taxes compared with 115 per cent. last year! Our appeals to the Mexican Government during the year for relief from this penal taxation again proved fruitless.

The Current Year

I have already mentioned the sale of our stocks of zinc concentrates. The return therefrom will depend on the London Metal Exchange prices ruling for zinc during the next six months or so. The outlook for zinc, however, looks reasonably bright and we may therefore expect this sale and the sale of our current zinc concentrate production to prove profitable and to provide some cash to offset the drain we are currently experiencing in financing increased stocks of refined lead. In the case of lead the outlook is not so bright, but even here I believe we have seen the worst of the current setback and that we may not have to wait too long before some modest improvement in demand and in the price of the metal occurs. When this happens, we will be enabled to sell our stocks and, I hope, return to a period of improved profitability and liquidity.

I am sure you will wish to join me in thanking Mr. H. B. Hanson, our General Manager in Mexico, Mr. A. B. O'Neel, our Assistant General Manager, and their loyal staff for their sustained efforts on behalf of the Company.

NATIONAL AND GRINDLAYS BANK

AN IMPROVED RESULT

The Annual General Meeting of National & Grindlays Bank Limited will be held on April 5 in London.

The following is an extract from the circulated statement by the chairman, Mr. J. K. Michie, for the year ended December 31, 1959:—

Since the last Annual General Meeting the capital structure of the company has been altered by paying up out of reserves 2s. 6d. per share and by making the 4,562,500 shares outstanding fully paid at 15s. per share. The results in figures appear in the balance sheet. As was expected and intended this step has made our shares more popular with the investing public and at December 31 last we had 4,158 shareholders against 3,699 a year earlier. We welcome this more widely spread interest in the Bank, a trend which still continues.

This year the total of our Balance Sheet at £163,035,588 shows an increase of £11,544,109 and our net profit of £404,708 is £33,001 higher than for 1958; but here I must point out that the profit figure is still considerably under that for the year 1957 and in consequence as I forecast last year, and as was confirmed by the Board when our capital alterations were announced in April last, we have not found it possible to increase the amount distributed to the shareholders. Two interim dividends each of 6½ per cent. have been declared making 12½ per cent. for the year—the equivalent of the previous payment of 15 per cent. per annum on the previous capital.

Although competition in all our territories has increased rather than diminished, in certain of them—London, India and Pakistan—conditions for banking as a whole became somewhat more favourable

— or less difficult — as the year progressed, hence the improvement we have been able to show.

It is foolish to object to or become upset by the entry of newcomers in the field or of new types of competition for deposits although sometimes the efforts made to attract business — and I presume to justify themselves to themselves — are hard to bear. In such circumstances our only consolation — if indeed it is one — is that many besides ourselves are affected. What we must continue to rely upon is the quality of the service we offer and the elasticity and initiative we show in meeting new developments and changing conditions. Success depends largely on our staff and in this respect we are fortunate.

Bank's Services

One of the services we now offer is the management of personal investments. This activity initiated a few years ago operates from the Trustee Department, 13 St. James's Square, London, S.W.1, but can be contacted through the Head Office or any branch of the Bank. With the steady widening of interest in the investment of savings through Stock Exchanges it is opportune to draw the attention of our shareholders and customers to this development of our business.

Our other ancillary services, our Trustee and Travel Departments now based entirely on 13 St. James's Square and our Income Tax Department which functions both at 54 Parliament Street and at St. James's Square, all made progress last year and as they become more widely known I am sure their development will continue. A Trustee Department is also available at our main branch in Nairobi, Kenya.

At the last Annual General Meeting I was asked if we had any capital interest in Hire Purchase. I am now able to report that we last year invested £50,000 in acquiring 20 per cent. of the capital of the Credit Finance Corporation Ltd., a company registered in Nairobi and which operates in Kenya and Uganda. Conditions in 1959 were not particularly propitious but the company by eschewing speculative risks is doing a satisfactory business and we shall receive a dividend during this financial year. We have also recently bought a small interest amounting to slightly less than 15 per cent. of the capital of the Mercantile Credit Ltd., Colombo.

India and Pakistan

The picture of easing financial tension which I described a year ago has been more than justified by events since then, one reflection of this being a rise of Rs. 23 crores in her external reserves. Encouraging progress has been made in developing both industry and agriculture while traditional major exports of tea and jute manufactures have found good markets at higher prices. Just as important, her cotton milling industry, like Lancashire's, has recovered from the doldrums of a year ago and is now pretty fully employed for both internal and external markets.

Under President Field Marshal Ayub's dynamic direction the face of Pakistan has been radically changed for the better since he succeeded to the Presidency in October 1958. Taxes have been paid, labour relations have improved and confidence has been restored; and the results, a greatly improved balance of payments situation and a general upsurge of activity in all fields including the most important one of food production where at last incentives are being offered to the cultivator and security to the consumer.

The improvement in the financial affairs and status of this country which was well under way a year ago has continued and it cannot be gainsaid that the result of the Election last October gave a distinct fillip to this welcome progress. None the less we have recently been reminded by the raising of the Bank rate from 4 per cent. to 5 per cent. that expansion still requires the rein of financial control, and that inflation is continuously lying in wait for the over-optimistic. Dearer money conditions in other countries, notably the U.S.A., Can-

ada and Germany, contributed to the arguments for a higher Bank rate.

In these circumstances it is hardly to be expected that the Budget will be a "soft" one although we can, I hope, look for some alleviation of our tax burdens.

About our own prospects for 1960 I am moderately optimistic. We have made an encouraging start and in so far as our fortunes are in our own control there is no reason why we should not continue on the same plane of progress.

THE CONSOLIDATED MINES SELECTION COMPANY LIMITED

OUTSTANDING YEAR FOR SOUTH AFRICAN GOLD MINES ACQUISITION OF CANADIAN INTERESTS

The following is an extract from the statement by the Chairman, Mr. A. Comar Wilson which has been circulated with the annual report for 1959:—

The year under review has been a satisfactory one, the profit after taxation being higher by about £34,000. I would remind you that last year we received an amount of £126,000 in Double Taxation Relief in respect of previous years, which was, of course, a non-recurring item and must be ignored in making a comparison between the full results of 1958 and 1959.

The year was an outstanding one for South African gold mining. Monthly output figures reached their highest level, with the newer producers in the Free State and Far West Rand more than compensating for gradual loss of gold production from the older mines of the Rand. Two of the newer mines, West Driefontein and President Brand are within sight of becoming the first Union gold producers to achieve a monthly working profit of £1 million.

Continued Interest in S. African Shares

Last year American buying was again an influence in the Union gold share market. Coupled with excellent results from some of the newer mines this led to firmness in prices especially for the shares of the new producers and their associated finance houses.

At the same time industrial shares in the United Kingdom had a substantial rise and this gave considerable impetus to the Unit Trust Movement. The majority of Unit Trusts in this country include one or more of the South African mining houses or Rhodesian copper mining houses in their portfolios, which heightens the demand for these shares. The quest by Unit Trusts for mining market leaders to invest in, especially those with a higher than average yield, is now tending to focus attention on the established Union gold producers, particularly the newer mines.

However, there was during 1959 a marked trend towards the repatriation of South African stocks. On balance, during the first nine months of the year £14 million of South African shares and securities previously held outside the Union were bought by South African residents. This phenomenon certainly indicates confidence in the future on the part of those resident in the country. Outside South Africa the industrial market in the United Kingdom and in many European countries has offered such great opportunities that it is not surprising that European holders of South African shares have been tempted to switch back into their own industrial stocks. The fact that, notwithstanding this, South African shares have been a buoyant market is most encouraging and an indication of

the underlying strength of the Union's economy.

A Notable Year for Diamonds

Last year was a notable one for diamonds. World sales at £91 million were £26 million up on 1958 and £15 million above the previous record established in 1957. Economic recovery in America had a big effect with the result that demand for both gem and industrial stones benefited.

Copper prices were higher than for 1958, ranging from a low point at about £210 a ton to a high of £267 per ton. The average cash price for the metal on the London Metal Exchange for the year was £238 or some £40 per ton above the previous year and Rhodesian producers benefited accordingly.

Some indication of the favourable effect on gold, diamond and copper share prices of some of the factors I have mentioned may be gained from the increase in the market value of our own investments over the year. The aggregate figure of quoted investments was £6.2 million at December 31, 1959, compared with £4.8 million at the beginning of the year. We had, however, about £300,000 more invested, taken at the usual Balance Sheet valuation.

We have acquired interests in McIntyre Porcupine and Locana Minerals. These are both Canadian companies. McIntyre Porcupine is well known as a mining company with high class management and a diversified portfolio of investments. Locana Minerals is a newly formed mining investment company which will, we hope, in due course provide us with opportunities to participate in new mining ventures in Canada.

We are proposing to keep the cash dividend at the same rate as for 1958. Shareholders received free in March 1959 one new share for every ten held and as these shares ranked for both the interim and final dividends for 1959 we are in effect paying out 10 per cent. more.

As your Company has had another good year we are also proposing to repeat last year's capitalization issue, again in the ratio of one fully paid new share for every ten shares at present held. This will be the fourth capitalization issue we have made in the last six years but each one has to be regarded as exceptional and not necessarily to be repeated.

Investment income has risen by well over £100,000 since 1953 when we first began to benefit from dividends from the new gold mines and we expect the present level to be at least maintained for the current year. In the absence of unforeseen difficulties we should, therefore, be able to pay the present rate of cash dividend for 1960 on the capital as enlarged by the proposed bonus issue.

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Shown here is the T2GH (High Tipping Model) designed for dumping into conveyors. Another version is available for tipping into shafts.

Atlas Copco Auto-Loader raises output, lowers costs in German coal mine

150% increase in drifting capacity

Germany's chief mineral asset is coal. In fact the rich German coal fields are among the most important in Europe. One of the leading mines west of the Rhine is Pattberg, which in 1958 produced almost 2 million metric tons of consumable coal. Despite the use of up-to-date methods and some of the most modern mining equipment available, Pattberg is faced with two of the current problems confronting the industry:—

- The urgent need to cut production costs to a minimum—due to the increasing competition for markets.
- The growing necessity to eliminate heavy physical labour—reflecting the rising living standards of mine-workers.

Engineers at Pattberg have found that mechanised loading is helping them to solve both problems. The original drifting capacity was 0.44 metres per man-shift. Now, by progressive improvements in loading technique, this has been raised to 1.16 metres—an increase of more than 150%. Their superiority to any similar machines having been proved by stringent tests, Atlas Copco T2GH Auto-Loaders are now in extensive use in the Pattberg mine.

A two-man team carries out the complete drifting operation—drilling, blasting, loading and timbering. While one miner is loading, the other prepares for timbering. The figures in the table refer to drifting in a cross-cut with an area of about 10m² where the average advance is about 2.5

metres a round. Statistics show the average time schedule for a team on an eight hour shift to be:—

		% of effective working time (excluding breaks)
drilling	95.5 minutes	26.7
charging and stemming	51 „	14.4
loading and sundry work	100.5 „	28.3
timbering	109 „	30.6
	356 minutes	100%

The Auto-Loader tips onto an armoured conveyor which is extended once a week. Haulage distance, thus, varies between 10 and 30 metres.

Atlas Copco Auto Loaders

are being used successfully throughout the world for applications for such as cut-and-fill stoping and sub-level caving in ore mines, cross-cut drifting in coal mines and loading operations on the surface. Perhaps they could help improve capacity at your mine? Contact your local Atlas Copco company or agent or write to one of the addresses below:



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BRITISH TIN INVESTMENT CORPORATION

SUCCESS OF TIN AGREEMENT CURRENT YEAR'S IMPROVED PROSPECTS

MR. S. H. SMITH'S REVIEW

The annual general meeting of the British Tin Investment Corporation, Ltd., will be held on March 23 at St. Swithin's House, 11/12 St. Swithin's Lane, London, E.C.

The following are extracts from the statement by the chairman **Mr. S. H. Smith, O.B.E., M.C.**, circulated with the report and accounts:

The gross revenue of the Corporation and its subsidiaries for the year ended December 31, 1959, was £520,297, compared with £543,728 for 1958. Administrative and other expenses amounted to £17,184 and the provision for taxation to £227,058 (against £259,073 for 1958); the reduction in the standard rate of British Income Tax has more than offset the reduction in gross revenue. After crediting £2,239 for adjustment of previous tax, and bringing back to credit £16,150 provision against the finance subsidiaries investments, no longer required, the net surplus of the group is £294,444. In 1958 the net surplus was £273,882.

The Dividend

The Directors recommend a final dividend of 16% for 1959, making a total of 22% for the year. As I explained in my Statement last year, the total effective dividends for 1958 were 22% although for reasons which I then gave, these were declared in the form of a 12% dividend for 1958 and a 10% final dividend for 1957. If the Directors' recommendation of a final dividend of 16% for 1959 is approved at the Annual General Meeting of the Corporation, the group's carry forward will be increased from £192,718 to £203,502.

The market value of our quoted investments at the end of 1959 was £8,124,394, which compares with £4,491,248 at December 31, 1958. The greater part of this appreciation is attributable to the marked increase in the value of our tin shares during the year. As a result, shares in tin companies represent about three-quarters of the market value of our portfolio, whereas last year they represented about two-thirds. In fact, on balance, we have very slightly reduced our tin holdings during the year. In 1959 we took a further stake in certain British industrial companies which have large interests in the metal industries.

Steady Tin Price

The International Tin Agreement has continued to operate successfully, the permissible export quotas of the six producing countries which are parties to the Agreement being progressively increased from 20,000 tons in the first quarter of 1959 to 36,000 tons in the first quarter of 1960, equivalent to about 95% of base-year capacity. The price of the metal has remained remarkably steady during 1959 at well above the corresponding figure for 1958. It seems reasonable to anticipate that it will be the aim of the International Tin Council to maintain the price of tin at or about the current level. If this aim is achieved, the higher prices and the substantial increases in export quotas should be reflected in 1960 and 1961 in the earnings and dividends

of the tin companies in which this Corporation is so substantially interested.

The outlook, however, is overshadowed by the estimated 10,000 tons of tin held by the Buffer Stock at the end of 1959 and the stocks of ore containing an estimated 12,000 tons of tin held in producing countries. It does not seem likely that 1960 will produce any noteworthy increase in the price of tin; indeed some fall is possible unless world consumption, particularly in U.S.A., proves greater than forecast.

Hope of New Agreement

The current International Tin Agreement expires in June 1961, and a new Agreement is at present being drafted for submission to the United Nations Organization in May this year. In spite of the obvious difficulties, it is to be hoped that, for the sake of stability in the tin industry, a new Agreement will eventually be evolved.

The political situation in the Federation of Malaya continues to improve. In August last elections were held for the House of Representatives and the Alliance Party was returned to power with a large majority. This has produced an improvement in both the political and economic atmospheres. Communist terrorists have been largely eliminated and many of the irksome restrictions on life necessitated by their activities in the past have been removed. We can look forward with confidence to a period of stable government in an area in which this Corporation is vitally interested. The increases in the permissible export quotas for tin should have a beneficial effect on employment in Malaya, where the restrictions on output in previous years have caused hardship and the closing of a large number of mines.

Copper Position

I am glad to say that the hope of a more satisfactory price for copper in 1959, which I expressed in my Statement a year ago, was fulfilled. In the first half of the year, the industrial recovery in U.S.A. proceeded with greater vigour than had been expected, producing a greatly increased American demand for copper and thus raising the price. Towards the middle of the year, however, the world surplus of copper began to make itself felt, causing the world price of copper to fall substantially from its peak. The market was considerably affected by the prolonged strikes in the U.S.A., first the steel strike and then a series of strikes in the U.S. copper industry. These latter strikes caused a loss of production exceeding the estimated world surplus of copper for the year.

When consumers' stocks of copper have been replenished following the strikes in the producing industry in U.S.A., it would appear that the true current world surplus of copper in 1960, even allowing for some increase in consumption, will again be of the order of 250,000 tons. In view of previous history, it seems most likely that the producers would take steps to curtail output.

Lead, Zinc and Oil

The situation in the case of lead and zinc is less obscure than a year ago. Following a conference held under the auspices of UNO in the early summer of 1959, cuts were made in exports of lead and zinc by producers outside U.S.A. As a result, the price of lead remained remarkably steady throughout 1959, whilst zinc, about which the estimates of consumption had been somewhat pessimistic, staged an impressive increase in price during the year.

The oil industry has also suffered during the year from excess capacity, high inventories and price weakness. Although consumption is still rising, it may be some time before a better balance is achieved between demand and capacity.

Steel Interests

Before 1959 we bought comparatively small holdings in several English steel companies. As a result of the General Election, the political uncertainty which had handicapped those companies was removed and I believe that we can look forward to a steadily increasing income from this source.

The Corporation's Investment Manager, Mr. C. E. Thornton, visited the United States and Canada in the autumn of 1959 and made valuable contacts and received much useful information.

Thanks to the successful operation of the International Tin Agreement and the better outlook for tin, the decline in the Corporation's gross income for 1959 was not as severe as I had at one time expected. In the absence of unforeseen major political or industrial upheavals, I think we can reasonably look forward to better results in 1960 than in 1959.

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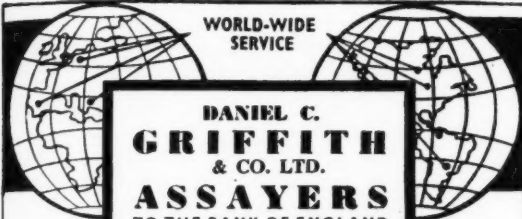
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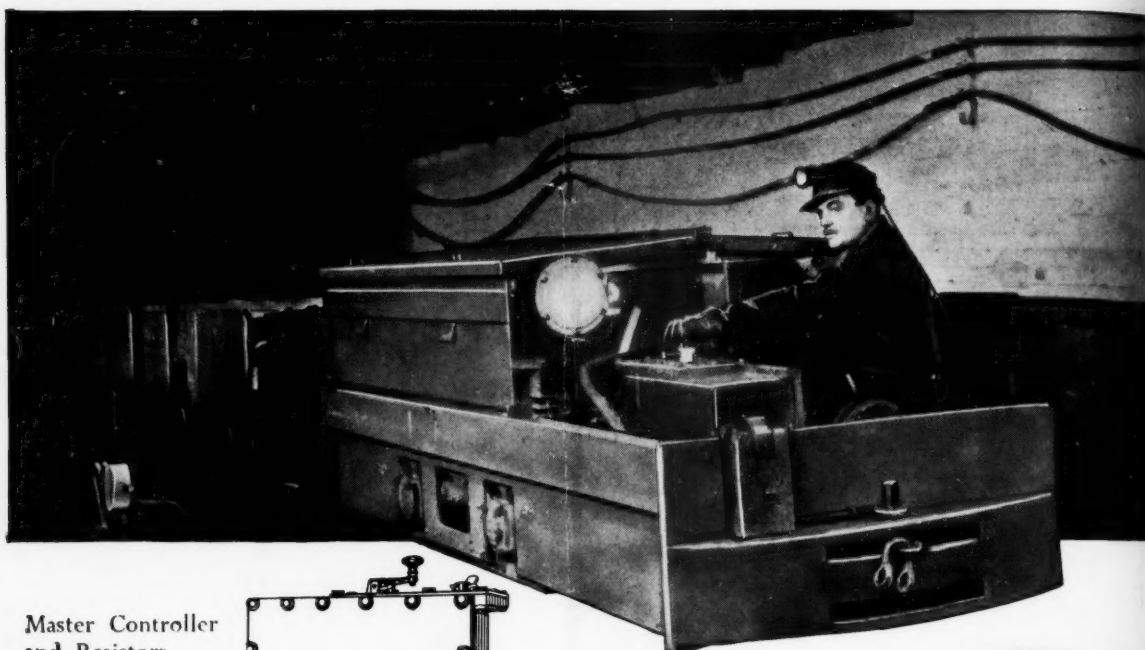
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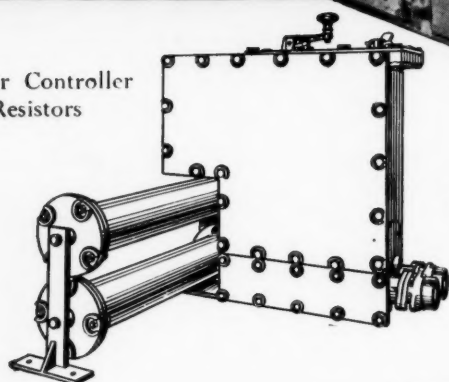
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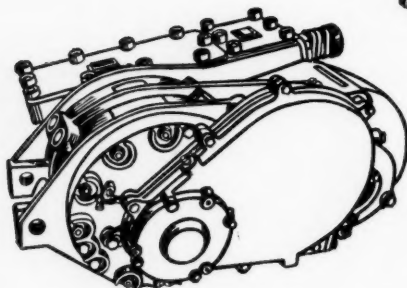
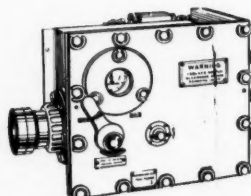
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